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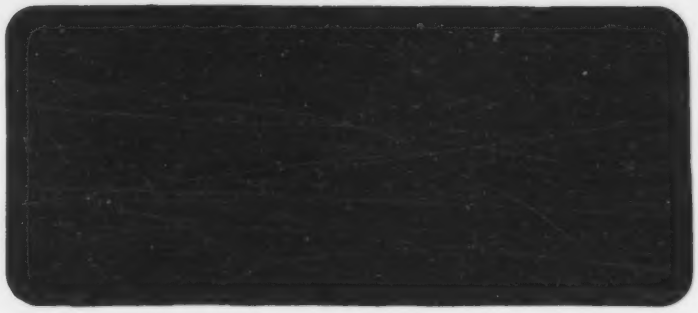

INDUSTRY DEVELOPMENT BRANCH

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HERB AND SPICE

Market Assessment and Feasibility Study

FINAL REPORT

Prepared for:

Saskatchewan Agriculture and Food

April 2001

INNOVATION
CONSULTING
GROUP

The report, "Herb and Spice Market Assessment and Feasibility Study, April 2001 Final Report " has been prepared by Innovation Consulting Group Ltd. on behalf of Saskatchewan Agriculture and Food. This report was based on a compilation of information obtained by Innovation Consulting Group Ltd. as well as interviews with various individuals from research, scientific, government, regulatory bodies, associations, producers, brokers, manufacturers and retailers. Change is a constant in all aspects of this sector. To the best of our knowledge this information is accurate as portrayed at this date but the reader is advised to conduct their own due diligence in order to determine the impact on their own situation. We do not express an opinion or any other form of assurance on the achievability of agronomic, production or price results. We have no responsibility to update this report for events and circumstances occurring after the date of this report.

Innovation Consulting Group Ltd.
May 2001

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Executive Summary

Innovation Consulting Group Ltd. was hired by Saskatchewan Agriculture & Food to conduct a study of the herb and spice industry with the following three objectives:

(1) conduct a market assessment, detailing market potential;
(2) conduct a feasibility assessment, assessing whether Saskatchewan could compete in this industry; and
(3) develop a buyers list, which could be used as a guide for Saskatchewan herb and spice producers.

In order to obtain the information required to complete the market overview and competitive intelligence analysis, a combination of personal and telephone interviews were conducted. Personal and telephone interviews were conducted with individuals and companies throughout the marketing channel including raw material suppliers, brokers, agents, contract manufacturers, food ingredient suppliers, researchers, food technology experts, distributors, retailers, seed suppliers, and spice millers/blenders. Other contacts included government market analysts and agrologists.

Two trips were undertaken to collect the required information. Attendance at the Natural Products Expo in Anaheim, California was beneficial in gathering not only contact information, but information on emerging trends in the natural products industry, and the current sources of supply and criteria used by the buyers or purchasers. A visit to Guelph, Ontario was also conducted which involved interviewing those individuals in the provincial government working with local growers, researchers studying the production of medicinal herbs for both human and animal production, and a supplier of seed to the industry.

In addition to interviews, an extensive literature review was conducted.

Medicinal Herbs

Size of the Industry

A recent consumer survey conducted by Harvard-based researchers indicated the U.S. herbal products market may be as much as $5.1 billion. Other estimates are somewhat lower than those derived from this study, but there is little question that it is the fastest growing segment of the dietary supplement industry.

In an industry overview article by Peggy Brevoort published in HerbalGram (No. 44, Fall 1998), the market was estimated at $3.7 billion as of July 1998 and allocated amongst various market channels. The market has virtually doubled since 1994, a 4-year period. [1]

[1] http://danr012.ucdavis.edu/pubs/SFNews/Spring99/herbs.html

The top-selling herbals in the U.S. mass market are shown in the following table.

Table 1 -Top-selling Herbals - Mass Market*
52 Weeks-July12, 1998

	US$-millions	% of growth
Ginkgo	138	140%
St John's Wort	121	2801%
Ginseng	98	26%
Garlic	84	27%
Echinacea	33	151%
Saw palmetto	20	138%
Grape seed	11	38%
Kava	8	73%
Evening primrose	8	104%
Echinacea/Goldenseal	8	80%
Cranberry	8	75%
Valerian	8	35%
All others	31	
Total	576	

Source: IRI July 12, 1998
*Food, Drug and Mass merchandise

Trade Data of Medicinal Botanicals[2]

- Canada imported $18.0 million of botanicals from the US in 2000. This represented 37% of Canada's imports in that year suggesting there is the opportunity for import replacement of $49 million per year for Canada.
- The US imported $170 million in medicinal botanicals from all sources in 2000. The two largest markets supplying the US were China and India representing 56% of cumulative imports. It is expected that as regulations are strengthened, that medicinal herbs buyers will look less at price and more at quality, suggesting increased opportunity for high quality suppliers such as Canada.
- Canadian exports of medicinal botanicals were $ 43.9 million in 2000, of which 74% represented exports to China.
- Excluding ginseng and licorice Canadian exports of medicinal botanicals was $2.4 million of which the US accounted for 71%.

Saskatchewan's Trade Position for Medicinal Herbs

In order to better analyze Saskatchewan's competitive position in the absence of adequate production numbers, Canada's exports by province were examined.

- Total Canadian exports other than ginseng and licorice were $2,404,000 in 2000 an increase of 55% since 1996.

[2] Strategis.

- Saskatchewan's exports were third highest in Canada with Ontario at $716,000, Quebec at $653,000 and Saskatchewan at $450,000.
- Saskatchewan's exports were $450,000 in 2000, representing 19% of Canadian exports and reflecting a 2038% increase over 1996.
- Saskatchewan growth in exports since 1996 were higher than the other provinces by a significant margin as shown below:
  - Ontario's exports grew 19%
  - Quebec's exports grew 88%
  - British Columbia's exports declined 19%
  - Alberta's exports grew 973%
  - Manitoba's exports declined 56%

Changing Regulations

As a result of feedback that Canada's competitive position on natural health products was being impacted by regulations which treated plants as either foods or drugs, Health Canada established a Committee to recommend changes.

The Standing Committee on Health made 53 recommendations covering 16 broad areas. On March 26, 1999 the government accepted and agreed with all the recommendations and announced the creation of the Office of Natural Health Products, now the Natural Health Products Directorate (NHPD). Some of the more significant recommendations included:

- The need for an appropriate definition for natural health products.

- The creation of a new regulatory authority and structure to regulate natural health products, reporting to the Assistant Deputy Minister of the Health Protection Branch, Health Canada. An Expert Advisory Committee was established to help Health Canada and the Transition Team.

- To staff the new organization with personnel and working groups who have expertise and experience in natural health products.

- That all inspection personnel be specifically trained and that inspection of premises take place on a regular basis.

- The recommendation that any need to amend the existing Food and Drugs Act should not delay the needed regulatory and administrative changes.

- In response to the requirement to establish appropriate Good Manufacturing Practices, to include specific quality control and testing for these products and that manufacturers, importers and distributors of natural health products should be obliged to hold valid establishment licenses, the new Office of Natural Health Products will guide the development of appropriate manufacturing standards, the necessary

requirements for licensing and development of appropriate training standards for inspectors.

- The Standing Committee recommended that manufacturers of natural health products be allowed to make health claims, including structure and function claims, treatment claims, and that Health Canada should assess these claims in a way that looks at types of evidence, such as professional consensus and traditional references, and not only at clinical trials. The label to clearly indicate the type of evidence used to support the claim. In response, the Office of Natural Health Products will look at criteria to determine the applicability of claims, and guidelines determining the appropriate levels of evidence to support any claims made.

- The Standing Committee on Health recommended a pre-market approval process for natural health products, which would ensure that products are safe and that claims are supported by reasonable evidence. This process would be based on a risk management approach that recognizes that natural health products fall along a continuum of relative safety and therefore require different levels of control. This assessment would apply to pre-market licensing and post-market monitoring. Recommendation 30 suggested that certain lower safety products be made available to consumers with appropriate warnings, while other lower safety product might require practitioner intervention. The proposed regulations propose a sixty day licensing period, which if not informed on licensing, the product is deemed to be licensed.

- The Standing Committee on Health recommended that Health Canada immediately begin to encourage research on natural health products, the results of which should be widely disseminated to stakeholders and consumers. This could include studies focusing on the interactions of herbal products with conventional medications as well as studies that explore different uses by various groups in Canada. The response indicated that the Office of Natural Health Products will be responsible for supporting research in areas of epidemiology and social science research.

A 17 member Transition Team was appointed, with the Transition Team making recommendations for the government to make the shift from a disease-centered to a wellness-centered model for health care in Canada.

As part of the consultation process, Phase II is the Development of a Proposed Regulatory Framework for Natural Health Products. In March 2001, a draft set of regulations was released and is available on the Health Canada website: www.hc-sc.gc.ca/hpd/onhp/phase2_e.html. This proposed regulatory framework contains provisions for product and site licensing, good manufacturing practices, labeling and packaging. The attempt in these regulations is to find a balance between protecting consumers' concerns of safety and product quality, without being unduly restrictive.

Implications

1. With the changes in regulations, the industry is moved closer to a pharmaceutical approach, which we believe is good. This should enhance the ability of the pharmaceutical companies to buy in, as they already have the dollars and expertise to take advantage of the opportunities.
2. With the change in regulations, the industry will be impacted through 1) nutrition labeling, 2) standard testing procedures, and 3) GMP. The intent is to have a higher quality product, backed by credible regulation. In return Canadian suppliers and manufacturers are going to have to raise their level of expertise.
3. The new regulations ask that on the application for a product license, information will be required that supports the safety of the natural health product, including the raw material and finished product specifications. The issue of the costs of testing at the raw material stage as well as the finished product stage, will continue to make it more economically viable for manufacturers to buy from large suppliers rather than a myriad of small suppliers.
4. Although a site license will not be required for a grower or a retailer, unless the grower is also manufacturing, all other members of the distribution chain, such as manufacturers and distributors, will require a site license. Each member of the distribution chain will require Good Manufacturing Practices, which requires a certain level of sophistication and record keeping. This will create a hurdle for small operations to overcome, although it is badly needed in the industry in order to address the issues of consumer safety and product credibility. Many of the members of the distribution chain currently buy only on price, which explains the significant level of imports. With these regulations, quality will be stressed, which should encourage import substitution with Canadian produced product. The regulations are expected to negatively impact some producers who are currently processing, as they will have to use appropriate facilities. This, however, will encourage the serious processors to expand.
5. A phase in period is allowed for all aspects of the regulations, including obtaining a product license and obtaining a site license. The full benefits to the Canadian manufacturer and producer will not be felt until these regulations are fully implemented.
6. During the interviews, a major concern was expressed about the fact that research is lacking on what are the effective ingredients, and the synergistic impact of ingredients. The commitment to the monographs as well as the formation of the Canadian Network for Herbal Medicine Research will provide a concerted effort on providing the research, which will enhance Canada's and Saskatchewan's competitive position.
7. If the regulations allow Canadian product to make validated health claims this will allow Canadian-produced products to be competitive with US imported products, and should allow Canadian products to be recognized as superior quality in the US market. In discussions with various individuals, there is a view that this will assist Canadian exports of manufactured product; however, it will be difficult for all actors in the distribution chain to measure up to these new standards.

At the same time as the regulations are changing, the Canadian industry is attempting to regulate itself in order to differentiate itself and therefore better compete. This should result in more consistency of testing procedures and thereby more consistency in results. We can rely on our traditional reputation as a leader in exports backed by science. The view is that these regulatory changes will enhance Canada's position as a reputable supplier of high quality products.

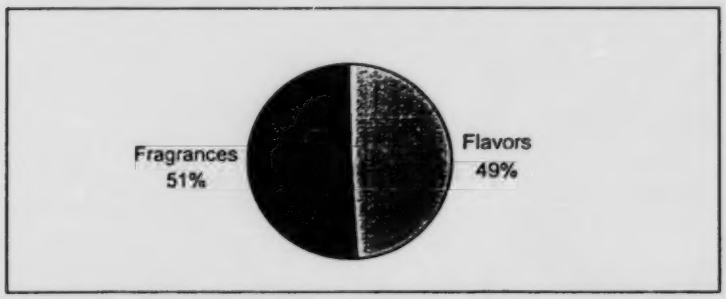
Essential Oils

Essential oils are derived from volatile aromatic compounds found in plants. The primary markets for essential oils are the flavour and fragrance industries, which includes soft drink companies, food companies, and perfume companies. Niche markets also exist for essential oils by producing products for aromatherapy.

Flavor and Fragrance Industry

The production and use of flavors and fragrances on an industrial scale started in the nineteenth century with the isolation of single chemicals responsible for the characteristic aroma of natural products (for example, cinnemaldehyde isolated from cinnamon oil and benzaldehyde from almond oil). The synthesis of aroma chemicals that reproduced the characteristic taste and odor of natural products has given rise to a new branch of chemical specialties. In 1998, the estimated total world Flavour and Fragrance Sales was $11 billion (US), with sales growth of 3- 4%.[3]

Figure 1 - 1999 World Flavour and Fragrance Market



Source: Leffingwell & Associates[4]

[3] http://www.leffingwell.com/top_10.htm
[4] Ibid

Trade Data[5]

- Canada imported $ 319 million of essential oils in 2000, of which 92% came from the US representing 24% of US exports.
- The US imported from Canada $32 million of essential oils (in Canadian dollars) which represented 5% of their total imports.
- The US market represented 91% of Canada's total exports of essential oils.
- Saskatchewan with $929,000 in sales during 2000 is the fourth largest exporting province following behind Quebec, Ontario and Alberta as follows:
  - Quebec 42% of Canada's exports
  - Ontario 42%
  - Alberta 12%
  - Saskatchewan 2%
- Growth in exports since 1996 has not been shared by BC:
  - Quebec exports rose 216% since 1996
  - Ontario exports decreased 11% since 1996
  - Alberta exports increased 27%
  - Saskatchewan exports increased 142%
  - BC exports decreased 66%

Spices and Dried Culinary Herbs

Spices are defined by the American Spice Trade Association as "any dried plant product used primarily for seasoning purposes". As such, the difference between a culinary herb and spice is limited. Included in this definition is tropical aromatics (pepper, cinnamon, cloves etc.); leafy herbs of the temperate zone (oregano, basil, sage, etc.); spice seeds (sesame, mustard, caraway etc.) and dehydrated vegetables used as spices (onion, garlic, chili peppers etc). All in all, the data reported here is largely comparable and for purposes of this report, data will be broken out between spices and dried herbs if provided. However, under this broad definition, the general trend is one in which both domestic and international consumption of spices and dried culinary herbs have steadily increased around the world during the past few decades.

Consumer Demand

The spice market has been increasing at a rate of 3 to 4% annually. This growth in the global market for spices is due to the following reasons:

- Increased demand for ethnic foods.
- Innovation in beverage products (such as flavored coffee, ready-to-drink teas and nutritional beverages).
- Growth in processed food consumption.
- Development of prestige product lines by the processed foods industry.
- Desire to make functional foods more palatable.

[5] Strategis

- Increasing demand for natural fragrances over synthetic aroma chemicals driven by public concerns over health and allergic reactions (in the US and Canada, the small male perfumes sector is growing the fastest).

Trade Data[6]

- Canada imports $90.7 million in spices of which $27.8 million is from the US.
- Total Canadian exports of spices were $28,400,000 in 2000 an increase of 74% since 1996
- Saskatchewan's exports were third highest after Ontario and Quebec.
  - Ontario share of Canadian exports 29%
  - Quebec share of Canadian exports 28%
  - Saskatchewan share of Canadian exports 20%
- Saskatchewan has a strong position in the crops they are exporting:
  - Anise sales during 2000 were $129,000 of which 100% came from Saskatchewan.
  - Coriander exports during 2000 were $3,700,000, an increase of 70% over 1996. Saskatchewan's market share of Canadian Coriander exports was 58% in 2000 up from the 1996 market share of 38%.
  - Caraway exports during 2000 were $4,700,000, an increase of 70% over 1996 levels. Saskatchewan's market share of Caraway exports was 65% in 2000 up from 1996 market share of 21%.

Fresh Culinary Herbs

The fresh herb market continues to increase in response to consumer demand fueled by greater public awareness for herb utilization in food preparation. France, traditionally one of the world's largest producers of fresh herbs, has been unable to meet the demand for local supply and increasingly imported fresh herbs.

Historically, limited shelf life has restricted the marketing options for fresh herbs, which has necessitated short distribution channels. This necessitated production within close proximity to markets. However, with improvements in transportation and technological advances in handling and storage, marketing options have expanded such that fresh product can be supplied in North America from almost any location. This is evidenced by fresh herbs being shipped from California to Canada.

Market Expansion Opportunities

Fresh culinary herbs are in very high demand since healthy eating and cooking are becoming more and more important in our daily lives. Fresh herbs add a great deal to both flavor and presentation of foods while reducing salt and calories in food preparation. Fresh herbs are high value crops that can be successfully grown without the use of pesticides.

[6] Strategis

However, to minimize quality loss and add value to culinary herbs and fresh herb products, optimum post-harvest protocols and new modified atmosphere packaging systems need to be developed.

Currently there is little information available and little industry knowledge of the proper post-harvest handling practices for fresh culinary herbs. In particular, there is considerable confusion as to how to package herbs.

Key Recommendations

The body of the report describes the key findings and recommendations related to medicinal herbs, essential oils, spices, fresh and dried culinary herbs. This section will bring together specific recommendations which are common to all four areas.

Recommendation One: The Need for a Vision

The province needs to spell out a vision as to what they view this industry could be within the next five years. In the view of the author this industry is similar to other fledgling industries which are now an essential part of the agriculture make-up of the province including canola and pulse crops. There has been enough work done on the agronomics to show that Saskatchewan can be competitive in a number of crops which can be enhanced with research. There has also been enough work done to show that the market is in the early growth stage with significant increase in demand yet to occur.

Related to the above must be the recognition and understanding that the producers and manufacturers who are currently involved are the innovators and early adopters. As they become more confident with production and marketing the industry will grow as the late adopters and the majority follow.

Vision also implies long term commitment. Currently the industry is stalled with minimal growth and declining prices. However, the research indicates increased uses of medicinal herbs in animal products and the introduction of new regulations will assure greater consumer confidence, all of which will be positive on demand and prices.

The KPMG study indicated that in 1999 the Saskatchewan nutraceutical and functional food industry of which natural health products is a part had sales of $50.0 million. With annual growth rates of 8% - 15% there is the potential that the current industry will be valued at $100.0 million by 2004. As disease issues are addressed, agronomic practices improved and appropriate cultivars identified there is the potential for the industry to grow to $200 million in 10 years time.

Recommendation Two: Funding for Market Specialists

The province needs to provide the tools for the innovators and early adopters to succeed. This is a very complex industry, with a great deal of difficulty for entrepreneurs to obtain information on market trends, prices and quality specifications. It is recommended that a provincial market analyst position be created within the provincial government dedicated to this sector as well as funding for an industry specialist, employed by the SNN to work with the Saskatchewan Herb & Spice Association and SNN members in order to assist in the development of new marketing initiatives particular to the SNN membership.

Recommendation Three: The need for Saskatchewan to play a greater role in national research consortiums in medicinal herbs.

The change in regulations will result in increased research being done by universities and research organizations on the health benefits and active ingredients of various herbs. There is at least one effort being made to form such a consortium (Canadian Network for Herbal Medicine Research at UBC) and at date of writing Saskatchewan was not a participant. The potential for Saskatchewan to identify and participate in major developments in the industry would be enhanced by participating in such a consortium or taking a major leadership role in the formation of such a national consortium. Saskatchewan has the stature to play a leading role at the national level.

Recommendation Four: Provide funding to hire a full-time Executive Director of the Saskatchewan Herb & Spice Association

The national scene identifies the Saskatchewan Herb and Spice Association as playing a major leadership role at a national level within the herb and spice industry as identified by a number of industry participants at different levels and across the country. This reflects the fact that the issues that Saskatchewan producers are experiencing are not confined to Saskatchewan but a national concern. To date, the work done by the Saskatchewan Herb and Spice Association has been done with volunteers, which is admirable but not sustainable. To sustain and build on these earlier efforts will require a full time paid director which for the initial few years will need to be funded by the government. Saskatchewan's image could be enhanced by so doing.

Recommendation Five: Funding for research for improved varieties

Funding for research to identify cultivars suitable to our climate and growing seasons are required by the industry. As well, funding needs to be provided to develop high quality germplasm through a combination of tissue culture/microspore techniques for cell identification (R&D by the Plant Biotechnology Institute) and plant breeding. This will create a competitive advantage for Saskatchewan producers as the market grows and becomes differentiated on quality.

Recommendation Six: Funding for Value Added Research

Opportunities exist for novel ingredients in both foods and natural health products. Funding needs to be available for investigating the concentration and fractionation of plant products by entrepreneurs in order to allow the manufacturing sector of this industry to focus on unique, novel food ingredients for use by major companies. This is a boom and bust industry which will be typified by periods of over-supply. A province with a processing sector has the potential to handle the problem of over-supply. Lower prices will create new uses, which are met by the products closest to the manufacturer.

Recommendation Seven: Funding for Additional Competitive Analysis

The visit to Ontario yielded information that could not be obtained elsewhere. It is proposed that market research monies be made available to the SNN or the Saskatchewan Herb & Spice industry to fund further evaluation of competitive efforts in California, Utah, British Columbia, and Europe.

Recommendation Eight: Funding for Commercial Steam Distillation

The POS Pilot Plant has hexane and alcohol distillation equipment. The Bio Processing facility has alcohol distillation equipment with a recovery system. The province does not have a steam distillation facility which could be used for toll extraction of medicinal herbs. We understand used equipment is available in western Canada which should be investigated for feasibility. The presence of such equipment is complementary to hexane and alcohol (methanol) extraction and will allow Saskatchewan producers to do further value added processing such as in the area of extracts. The feasibility analysis needs to explore an appropriate location, but with sufficient steam, the Bio Processing facility would appear to be a suitable site.

1 Introduction

The objectives of the project were to (1) conduct a market assessment, detailing market potential; (2) conduct a feasibility assessment, assessing whether Saskatchewan could compete in this industry; and (3) develop a buyers list, which could be used as a guide for Saskatchewan herb and spice producers. The market was segmented into spices, culinary herbs (fresh and dried), essential oils and plant extracts, and medicinal herbs.

In order to obtain the information required to complete the market overview and competitive intelligence analysis, a combination of personal and telephone interviews were conducted. Personal and telephone interviews were conducted with individuals and companies throughout the marketing channel including raw material suppliers, brokers, agents, contract manufacturers, food ingredient suppliers, researchers, food technology experts, distributors, retailers, seed suppliers, and spice millers/blenders. Other contacts included government market analysts and agrologists.

Two trips were used to collect the required information. Attendance at the Natural Products Expo in Anaheim, California was beneficial in gathering not only contact information, but information on emerging trends in the natural products industry, and the current sources of supply and criteria used by the buyers or purchasers. A visit to Guelph, Ontario was also conducted which involved interviewing those individuals in the provincial government working with local growers, researchers studying the production of medicinal herbs for both human and animal production, and a supplier of seed to the industry. Guelph is the centre of the food and natural health product industry for research and science with the personnel from the university and government laboratories working closely with all channel participants from growers through to health care providers. The Guelph area is not the centre of herb production for Ontario. Much of this is centered further south and west in the tobacco growing areas adjacent to Lake Erie.

In addition to interviews, an extensive literature review was conducted.

2 Definitions

The herb and spice industry is besieged by terms and definitions, which attempt to classify the various categories of products. The following is a list of definitions commonly used within the industry.

2.1 Spice Definitions

Spices - come from tropical regions and involve seeds, roots, fruits, flowers or bark. Spices tend to be brown, black and red with a stronger, pungent flavor. The term "spice" has come to mean the whole family of dried plant seasoning, including spices, herbs, blends and dehydrated vegetables.[7]

2.2 Health Food Products

Nutraceutical – a product isolated or purified from foods that is generally sold in medicinal forms not usually associated with food. A nutraceutical is demonstrated to have a physiological benefit or provide protection against chronic disease.[8]

Functional Food – similar in appearance to, or may be, a conventional food, is consumed as part of a usual diet, and demonstrated to have physiological benefits and/or reduce the risk of chronic disease beyond basic nutritional functions.[9]

Natural Health Products – substances or combinations of substances consisting of molecules and elements found in nature, and homeopathic preparations, sold in dosage form for the purpose of maintaining or improving health and treating or preventing disease/conditions. All products sold in dosage form (including nutraceutical) would be included under this definition.[10]

Dietary Supplement – a product (other than tobacco) that is intended to supplement the diet that bears or contains one or more of the following dietary ingredients: a vitamin, a mineral, a herb, or other botanical, an amino acid, a dietary supplement for use to supplement the diet by increasing the total daily intake, or a concentrate, metabolite, constituent, extract, or combination of these ingredients.

[7] Health Canada.
[8] Ibid.
[9] Ibid.
[10] Ibid

2.3 Herbal Definitions

Herbs - grow in temperate regions and are generally fresh or dried leaves. Herbs are green and have a milder flavor. Specific uses for herbs are determined in four major markets. These are the culinary market (fresh and dried), the pharmaceutical market, the medicinal/supplement market and the market for essential oils.[11]

Medicinal Herb – A plant, either cultivated or wildcrafted, utilized for its medicinal value.

Botanical – means a whole plant or plant materials, algae, macroscopic fungi, and combinations thereof.

Markers – Generally employed to estimate the quantity of plant material or plant preparation in the finished product when constituents with known therapeutic activity are not found or are uncertain. Markers are chemically defined constituents of a medicinal material utilized for control purposes.

2.3.1 Herbal Preparations

Phytopharmaceutical/Phytomedicines – A plant substance that has been processed to a standard of a particularly identified active chemical component or marker chemical component found within the plant.

Capsules – ground herbs inserted into hard gelatin capsules of varying sizes.

Compound – herbal formula composed of two or more herbal agents, which are organically compatible

Concentrate – fluid extracts that are strengthened through evaporation of their liquid

Decoction – water solution of plant extractions (including coarse and brittle plant structures)

Extract – solution (e.g. water, alcohol, glycerin) of the essential constituents of an herbal agent

Infusion – herbal agent steeped in liquid

Poultice – soft, usually heated, and semi-liquid herbal mass, which is spread on cloth and applied to an area of the body

[11] Alberta Agriculture, Food, and Rural Development: www.agric.gov.ca/agdex/200/6383001.html

Tincture – fluid extracts, with key medicinal ingredients withdrawn into a menstruum (alcohol, glycerin, or vinegar) solution (acid tincture)

2.3.2 *Aromatic Herbs*

Aromatherapy - the use of essential oils and hydrosols obtained by distillation (from named botanical species) via inhalation through the sense of smell and through application, to treat mental, emotional and physical states.

Distillation - process of vaporizing a substance by heat, condensing the fluid by cold, and collecting the liquid in a receiver.

Essential Oil - fragrant volatile materials contained within plant cells and derived by physical process (such as distillation) from the plant. The many different chemical components have more odor than others, but the totality of the components are the eponymous scent or odor of the plant.

2.4 Marketing Terminology

Distributor – means a person who sells natural health products to another person for the purposes of further sale.

Manufacturer – means a person who fabricates, processes, and preserves a natural health product for purposes of sale. The term manufacturer *does not* include an individual who grows, dries, and then sells the leaves of the medicinal plant to a manufacturer.

3 Medicinal Herbs

Medicinal herb products are the fastest growing segment of the plant extract industry. This massive increase in consumer usage of medicinal products is a factor of increased advertising by major companies, and the spin-off from the green, natural and organic sentiments in the community. Consumers have been driving this increased demand and acceptance for herbal products.

3.1 Global Medicinal Herbs Market

The world market for herbal remedies is estimated to be $14 billion US in 1996, with Europe at $7 billion, Japan at $2.4 billion, North America at $1.6 billion and the rest of the world at $3 billion. The most developed market is Germany at $3.5 billion, France at $1.8 billion and Italy at $0.7 billion. [12]

In European countries, and especially Germany, consumer and doctor acceptance of the use of medicinal herbs has resulted in a very open regulatory climate. In fact, 80% of German doctors regularly prescribe medicinal herbs and their study is part of the physician's training in medical schools.

The only countries with prescription sales of herbal medicines are Japan, Germany, China, and India, which, in some cases, are covered by medical insurance plans. Most of the sales in North America and Europe are over-the-counter. Germany comprises half of all European medicinal market and Germany's per capita consumption of herbal medicines is about 10 times that of any other European country.

3.2 North American Medicinal Herb Market

The North American consumption of dietary supplements including medicinal herbs is increasing at a rate of 8 – 15% annually.[13] The North American market for medicinal herbs is driven by consumer demand for alternative health therapies. Consumers are better informed on health issues and are exploring options on improving and maintaining their health. In response, manufacturers are offering North American consumers with a wide range of herbal remedies.

3.2.1 Consumer Demand

Consumers throughout North America are seeking and using medicinal herbs for various reasons including:

[12] Forest Renewal BC, An Economic Strategy to Develop Non-Timber Forest Products and Services in British Columbia, March 15, 1999, page 28

[13] Nutrition Business Journal, October, 2000.

- Dissatisfaction with western health care (unwanted side effects; ineffective treatments)
- Increasing costs of western health care
- Cultural or spiritual/religious needs
- Increasing population of aging baby boomers who want to maintain good health in old age
- Interest in returning to a more a natural lifestyle

3.2.2 *Structure and Distribution Systems of the North American Medicinal Herbs Industry*

3.2.2.1 Organizational Structure

Many players are involved in the distribution channel for medicinal herbs. Identifying who the buyer is in the medicinal herb market is not a simple task, due the multiple marketing channel options that exist. At the trade show, it was revealed that the buying process may take any of the following forms:

- Manufacturers grow the materials themselves.
- Growers call brokers to sell herbs.
- Growers process the materials and sell the semi-processed product themselves
- Growers contract a third party to do the processing and then sell the product themselves.
- Large companies send scouts out to areas where specific herbs are known to be grown, in order to approach local farmers.
- Small farmers make contracts with manufacturers and by-pass the broker.

The buyers typically require that herbs are dried and ground prior to purchase. Many companies now require that each lot of herbs being purchased be tested prior to purchase, for levels of active ingredient and for the presence of heavy metals, chemical residues, bacteria, molds and yeast. The grower is responsible for the costs of these tests.

The manufacturing of medicinal herbs in North America is generally undertaken by two major groups: (a) nutritional supplement manufacturers that produce a broad range of supplements including herbal products and (b) pharmaceutical companies who until recently focused on pharmaceutical products and are now producing herbal products also. The few large companies in the industry control a large share of the total market. This is markedly true for manufacturers where more than 50% of total manufacturing sales are controlled by less than 2% of the total number of manufacturers. Similarly, there are a small percentage of distributors whose sales account for a large part of the market. [14]

Most of the supplement manufacturers are not equipped for high quality processing of medicinal herbs. They typically source standardized extracts and dried/powered herbs from raw material suppliers and do the final blending, encapsulation, tabulating, filling,

[14] Canadian Health Food Association, Sector Profile.

bottling on-site or employ the services of custom manufacturers to undertake these stages of processing.

Overall, the trend is a shortening of marketing channels. Approximately half of the manufacturers interviewed indicated they receive their raw materials through contracts with the producers. It was generally stated that only processors who do not care about quality buy from brokers because the product is often stored at the broker's warehouse for a long period of time thereby affecting quality. Furthermore, many manufacturers distribute their own products as well as grow and harvest their own raw materials. The remaining manufacturers indicated that they buy from raw material suppliers and sell their product to distributors.

R&D functions are also blurred in the marketing channel. It could be that the raw material supplier has its own R&D, or this may be performed by the contract manufacturer. Packaging may be done at the manufacturing stage or the distribution stage.

3.2.2.2 Consolidation

There is increasing consolidation in the industry at all levels of sales: wholesalers, retailers, and distributors. This demonstrates the increasing stability and maturity of the industry.

Table 2 - Mergers and Acquisitions in the Industry

Companies	Year of Merger/Acquisition
Celestial Seasonings/Botalia	1995
Chattem/Sunsource International	1997
Jones Pharma Inc./Crystal Star Herbs	1997
SmithKline/Abtei	1997
Celestial Seasonings/Mountain Chai	1998
Natrol/Pure Gar	1998
Natrol/Laci le Beau	1998
Quality Botanical Ingredients/Botanical Products International	1998

Source: Rural Industries Research and Development Corporation - Australia[15]

One reason for consolidation includes, raw material suppliers wanting to offer a broad product line, which includes powders, teas, and standardized extracts. As a result, the number of brokers are declining.

[15] http://www.rirdc.gov.au/reports/EOI/00-51.pdf; page 19

3.2.2.2.1 Implications

- The supply side companies are getting larger and want good quality materials at low prices. They want to see certificates of analysis.
- They want to make long-term commitments and want assurance that the producers are financially secure.
- Domination of the supply side by large companies is signaling the end of brokers and distributors. Smaller brokers are selling off their inventory to convert it to cash. As confirmed by our telephone interviews, many of the numbers of the brokers listed were no longer in service.

3.2.2.3 Increased Involvement of Multinational Companies

Most of the large pharmaceutical companies have already entered the herb business or are at the very least closely reviewing the market. Warner Lambert and Bayer have introduced herbal products and this is adding "respectability" to the market. In addition, the entry of these companies is driving demand for high quality raw materials.

3.2.2.4 Distribution Channels for Medicinal Herbs

The distribution channels for various herb markets differ significantly. For some herbs, no grading system exists and buyers will make their selections based on the color, aroma, flavour, or texture of the herb. For producers approaching a buyer for the first time, a sample will be required. In order to eliminate quality variability, buyers will restrict their purchases to known growers. It is necessary therefore that the grower builds a reputation for consistent quality herbs.

The herbs are dried and sold to raw material suppliers. In the interviews, the raw material suppliers indicated that they would like to see the herb in a processed form (ground and extracted). However, manufacturers do not want producers to do the processing basically due to the fact that they do not see producers as having the ability to properly process and extract the herb to their specifications.

3.2.2.5 Key Players

The supplement industry is composed of approximately 120 companies that specialize in the manufacturing, marketing, and distribution of supplements. There are another 130 – 180 smaller companies that purchase the manufactured supplements from the large private label manufacturers. These smaller manufacturers usually distribute their products to a very localized market.

3.2.2.5.1 Retailers

60% of the total retail dietary supplement sales are from the larger firms including (mass market accounts for 56% of supplements and 44% in specialty stores):

- Schiff Food Products Co. Inc. (branch of Weider Nutrition International)

Salt Lake City, Utah
(801) 975-5300
www.schiffvitamins.com

- Leiner Health Products
  Carson, California
  (310) 835-8400
  www.leiner.com

- Pharma vite
  Mission Hills, California
  (818) 221-6200
  www.pharmavite.com

- Country Life
  Hauppauge, New York
  (631) 231-1031
  www.country-life.com

- Synergy Plus Inc. (branch of IVC Industries Inc.)
  Freehold, New Jersey
  (732) 308-3000
  www.ivcinc.com

- Viobin USA
  Monticello, Illinois
  (217) 762-2561
  www.viobinusa.com

For further information on each company, refer to the Buyers List, in Section 18.

3.2.2.5.2 Pharmaceutical companies

The second largest group that manufacturers and distributes medicinal herbs is the pharmaceutical companies. While medicinal herbs only make up a fraction of their business, it is still significant. The main drivers of the pharmaceutical industry are:

- Wyeth-Ayerst Pharmaceuticals
  Radnor, Pennsylvania
  (610) 902-1200
  www.wyeth.com

- Warner Lambert Consumer Group (branch of Pfizer Inc.)
  Maryville, Illinois
  (618) 343-2846
  www.pfizer.com

- Bristol-Meyers Squibb
  Pennington, New Jersey
  (609) 252-4000
  www.bms.com

- Pharmacia & Upjohn Corporation
  Peapack, New Jersey
  (908) 901-8000
  www.pnu.com

The pharmaceutical companies market through mass market channels. For further information on each company, refer to the Buyers List, in Section 18.

Accounting for 15% of retail sales, General Nutrient Corporation (GNC) and Shaklee Corporation account for 15% of supplement sales. GNC sells through its own stores. Shaklee distributes its products through distributors that sell to consumers.

Sunrider and Excel are the key multi-level marketing businesses.

3.2.2.5.3 Raw Material Suppliers

There are approximately 11 raw material suppliers in this industry. These companies purchase both raw and processed herbs and sell them to manufacturers or tableters and encapsulators. These 11 include:

- Hauser Inc.
  Boulder, Colorado
  (800) 241-2322
  www.hauser.com

- Pure World Inc.
  Bedminster, New Jersey
  (908) 234-9220
  www.pureworld.com

- Traco Labs
  Champaign, Illinois
  (217) 352-5800
  www.tracolabs.com

- Triarco Industries Inc.
  Fountain Valley, California
  (714) 241-7300
  www.triarco.com

- Bio-Botanica Inc.
  Hauppauge, New York
  (800) 645-5720
  www.bio-botanica.com

- Maypro Industries Inc.
  Purchase, New York
  (914) 251-0701
  www.maypro.com

- A.M. Todd Botanicals
  Kalamazoo, MI
  (616) 343-2603
  www.amtbotanicals.com

- Interhealth Nutraceuticals
  Benecia, California
  (707) 751-2861
  www.interhealthusa.com

- Quality Botanical Ingredients
  South Plainfield, New Jersey
  (908) 668-0088
  www.4qbi.com

- Frutarom Inc.
  North Bergen, New Jersey
  (201) 861-9500
  www.frutarom.com

- Pharmline Inc.
  Florida, New York
  (845) 651-4443
  (currently no website)

For further information on each company, refer to the Buyers List, in Section 18.

3.2.2.5.4 Processors/Tableters

Generally the material purchased by the raw material supplier is either already partially processed or they do the drying and powdering themselves. The herb in its processed form is sometimes sold to tableters. Tableters generally do not have facilities to powder the herb. Key tableters include:

- Nature's Way Products
  Springville, Utah

(801) 489-1500
www.naturesway.com

- Twin Labs
  Salt Lake City, Utah
  (801) 363-4060
  www.twinlab.com

- Solgar
  Leonia, New Jersey
  (201) 944-2311
  www.solgar.com

- Nature's Sunshine Products
  Provo, Utah
  (801) 798-4200
  www.naturessunshine.com

- SISU Enterprises Co. Inc.
  Burnaby, British Columbia
  (604) 420-6610
  www.sisuhealth.com

- Vita Health (branch of Leiner Health Products)
  Carson, California
  (310) 835-8400
  www.leiner.com

3.2.2.6 Increase in Advertising Investments by Major Companies

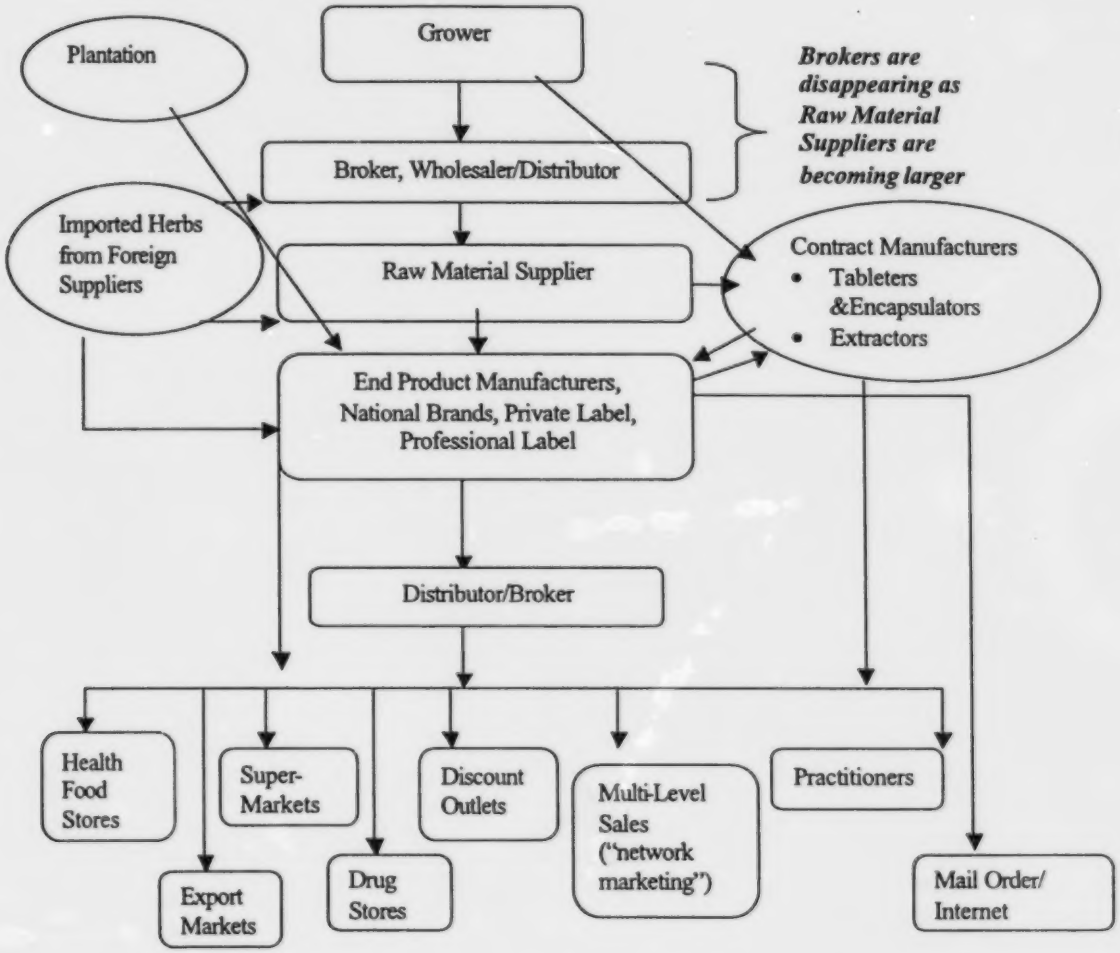
The rapid growth of the herbal products has been tied to significant increases in expenditures on advertising, particularly by the mass market channels, as the table below shows.

Table 3 -Estimated US Advertising Expenditures on Botanical Products: 1998 (mass markets)

Company	Est. Expenditure ($ millions)
American Home Products	$12
Bayer	$35
Celestial Seasonings	$25
Lichtwer Pharma	$28
Pharmaton	$26
Pharmanex	$15
Pharmavite	$5
Sunsource	$43
Warner Lambert	$15
Total	$204

Source: Rural Industries Research and Development Corporation - Australia

Figure 2-Medicinal Herbs Distribution Channel



3.2.2.7 Inefficient Industry Structure

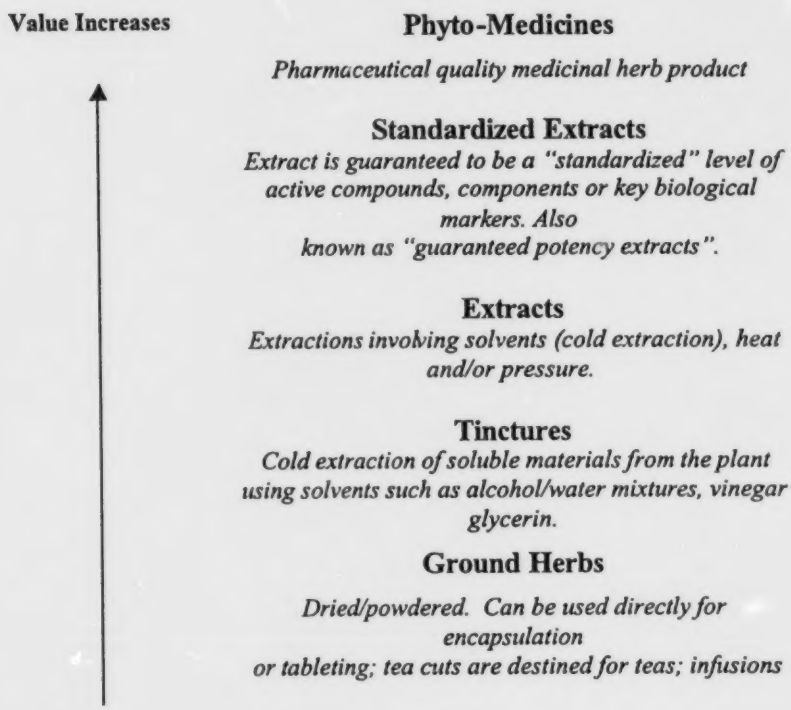
During the interviews conducted during the study in both Saskatchewan and Ontario, a lack of cooperation among industry participants is evident. In Ontario interviewees have also experienced a lack of cooperation and paranoia among industry participants. The end result of this has been the development of a disorganized industry. As an example, successful processors have found niche markets but are located in areas of Ontario that are not ideal in terms of transport costs to the facility. Although the processor may be successful, the industry is not better off as the processor is not located in an economically ideal location.

A lack of cooperation has also led to a lack of information on production techniques. Growers don't know how or when to harvest. Furthermore, there has been little research into equipment needed for harvesting. To create an environment for logical and economical development as well as a forum for information sharing, a virtual business cluster is being designed in Ontario. The virtual cluster environment will enable those in the cluster to talk to each other, right from the grower to the health care provider. It is hoped that this effort will stop the infighting, and make the industry as a whole more efficient and its participants more knowledgeable.

3.2.3 *Processing of Medicinal Herbs*

Medicinal herbs are processed at several stages depending on the desired end product and use of the herb. The following diagram depicts the different types/stages of processing of medicinal herbs.

Figure 3 - Processing Levels of Medicinal Herbs


Value Increases
Phyto-Medicines
Pharmaceutical quality medicinal herb product
Standardized Extracts
Extract is guaranteed to be a "standardized" level of active compounds, components or key biological markers. Also known as "guaranteed potency extracts".
Extracts
Extractions involving solvents (cold extraction), heat and/or pressure.
Tinctures
Cold extraction of soluble materials from the plant using solvents such as alcohol/water mixtures, vinegar glycerin.
Ground Herbs
Dried/powdered. Can be used directly for encapsulation or tableting; tea cuts are destined for teas; infusions

3.2.4 *Boom or Bust Industry*

Estimates indicate that 60-70% of major herbs are now cultivated making oversupply a possibility. For example, according to Bill Betger, professor of the University of Guelph, one producer in Denmark planted 50 acres of Milk Thistle and flooded the market. As long as the industry continues to not be regulated and anyone can get into it, oversupply is expected. The only way to deal with this situation is make sure that the processing is available to deal with the excess amount of herb in the market. For example, ginseng sales have slowed, and in order to make use of the herb it is being made into an everyday commodity. It can now be found in soups, drinks, as a finished-goods product, and in cosmetics, but you need to have the processing to absorb the over-production that can result in this industry.

3.3 United States

A recent consumer survey conducted by Harvard-based researchers indicated the herbal products market may be as much as $5.1 billion. The estimate is based on a telephone survey of 2,055 randomly chosen adults in the U.S. population. The study's results were published in the November 1998 issue of the *Journal of the American Medical Association.* Other estimates are somewhat lower than those derived from this study, but there is little question that it is the fastest growing segment of the dietary supplement industry.

In an industry overview article by Peggy Brevoort published in HerbalGram (No. 44, Fall 1998), the market was estimated at $3.7 billion as of July 1998 and allocated amongst various market channels. The market has virtually doubled since 1994, a 4-year period. [16]

However, according to Dr. Herbert Loveless, healthcare expert with the consulting group ExperTeam, the market is expected to peak at $6 to $8 billion in the next two to three years. Loveless does not believe that the US herbal market can markedly outperform the more mature market in Europe, which is currently valued at $6 billion. He believes that the supplement industry's only hope for continued growth is new federal legislation that will establish a separate track for herbal medications (other than new drug applications which are too costly) that will give some type of exclusivity.

3.3.1 *United States Consumer Information*

According to a study by Prevention Magazine in 1997, nearly 60 million Americans over the age of 18 (32% of the US population) were using herbal remedies. According to a 1997 Gallup Study, the typical profile of a herbal user is as follows:

[16] http://danr012.ucdavis.edu/pubs/SFNews/Spring99/herbs.html

1) 56% of users were female
2) 71% of users were between 18-49
3) 39% were using herbal remedies on a daily basis

3.3.2 U.S. Sales of Medicinal Herbs

The top-selling herbals in the U.S. mass market are shown in the following table. The market at the end of 1999 is reported to approach more than $4 billion at retail, with the fastest growing markets being mass mainstream outlets (supermarkets, drug and mass merchandise).

The data in the following table illustrates the growth of the market. As the table indicates, increases in sales in the 52 weeks ending July 12, 1998, range from 26 percent, to 2801 percent for St. John's Wort.

Some patterns of growth are interesting to note. For example, when aggregated into a relatively small number of functional categories, the data shows that the herb associated with managing mild to moderate depression, such as St. John's Wort, grew by 2801 percent in 1998. In comparison, herbs having purported therapeutic effects on brain function, such as Gingko, grew by 140 percent, while calmative herbs, such as Kava Kava, grew by 73 percent. Herbs targeting the immune system, such as Echinacea and Goldenseal, grew by about 80-151 percent, while men's herbs, such as Saw Palmetto grew by 138 percent.

Table 4 -Top-selling Herbals - Mass Market*
52 Weeks-July12, 1998

	US$-millions	% of growth
Ginkgo	138	140%
St John's Wort	121	2801%
Ginseng	98	26%
Garlic	84	27%
Echinacea	33	151%
Saw palmetto	20	138%
Grape seed	11	38%
Kava	8	73%
Evening primrose	8	104%
Echinacea/Goldenseal	8	80%
Cranberry	8	75%
Valerian	8	35%
All others	31	
Total	576	

Source: IRI July 12, 1998
**Food, Drug and Mass merchandise*

3.3.3 Sales Channels for Medicinal Herbs in the U.S.

The following table indicates that multi-level marketing plays a large role in the distribution channel for medicinal herbs in the U.S.

Table 5 - U.S. Market for Medicinal Herbs - Sales Channels 1997

Distribution Channel	Sales (US$ Million)	Percent of Total
Multi-Level	$950	35%
Retail-Health Food	$925	34%
Retail-Mass Market	$440	16%
Mail Order	$225	8%
Practitioners	$100	4%
Specialty Shops	$50	2%

Source: British Columbia Ministry of Agriculture and Food.

Although herbal medicines are available in almost any retail outlet including the corner grocery and convenience stores, the major channels are still the natural food outlets and multi level sales from such companies as Amway, Nature's Sunshine, and Shaklee.

However, mass market sales through food, drug and mass merchandise outlets have seen the most dramatic documented growth in sales since 1995 and now account for 16% of the total sales. This has resulted from the entry of multinational consumer companies and the influence of major natural product chains such as Whole Foods and Wild Oats.

Other channels for the sales of botanicals are mail order catalogues, club store sales such as Sam's Warehouse and directly from health care practitioners (including acupuncturists, naturopaths and chiropractors) and sales over the Internet. Amazon now sells herbal products over the Internet.

3.3.4 Trade Data

To determine the trade of herbal medicinals between US, Canada, and globally, data was sought under the "Harmonized Commodity Code" first 6 digits as countries may use different annotations beyond the asic 6-digits code. The medicinal botanicals fall under the category HCC1211.00 – "plants and parts of plants...used in perfumery, in pharmacy or for insecticidal, fungal , or similar purposes, fresh or dried." Since the Statistics Canada system of tracking imports and exports of medicinal herbs lacks refinement, it is not possible to obtain accurate figures on volumes and values of these products. The only species at present which is segregated are licorice root and ginseng root – all other species are grouped under the category "not elsewhere specified" (HC1211.90).

The following table illustrates the top 18 global US exports, expressed in Canadian dollars. Canada is the number one export market accounting for 19% of the total US

exports of medicinal botanicals, followed by the United Kingdom at 10% and Malaysia also at 10%.

Table 6 – U.S. Exports of Medicinal Botanicals (Values in Canadian Dollars)

	1996	1997	1998	1999	2000	% of 2000 total	Cumulative %
Canada	12,833,813	14,318,383	17,185,980	17,094,396	18,045,462	19%	19%
United Kingdom (U.K.)	3,284,796	2,990,393	5,923,592	6,395,362	9,610,995	10%	29%
Malaysia	2,451,974	10,698,906	12,863,388	6,709,097	9,248,513	10%	38%
Germany	9,140,422	6,494,140	10,253,544	6,123,613	7,903,227	8%	46%
Hong Kong	421,276	4,887,626	3,758,089	9,366,306	6,952,741	7%	54%
Taiwan (Taïpei)	2,335,874	8,849,639	6,846,535	7,580,330	5,194,835	5%	59%
Japan	3,182,366	4,408,569	1,709,605	11,281,714	4,903,750	5%	64%
Netherlands	1,056,888	1,082,318	1,015,447	2,800,305	3,514,017	4%	68%
Saudi Arabia	1,520,184	1,996,141	1,785,200	1,606,234	3,195,152	3%	71%
Kuwait	1,167,806	840,187	2,290,132	1,848,733	3,021,576	3%	74%
Mexico	1,661,502	3,427,236	3,973,369	3,370,708	2,756,464	3%	77%
Ireland	4,031,637	3,142,066	4,369,291	3,419,468	2,751,477	3%	80%
China (excluding Mongolia)	853,607	109,973	2,875,789	773,558	2,669,218	3%	83%
Philippines	41,965	44,741	986,186	227,641	2,615,045	3%	85%
Korea, South	1,475,845	205,635	1,441,208	1,330,121	2,439,535	3%	88%
France	2,425,809	471,199	3,254,455	3,929,559	1,925,547	2%	90%
Singapore	169,849	54,156	873,439	3,510,443	1,673,535	2%	91%

Source: Strategis[17]

The table below illustrates the top 15 global US imports, expressed in Canadian dollars. China is the number one importer to the US of medicinal botanicals, followed closely by India. Together, China and India account for 56% of the imports of medicinal botanicals into the US.

[17] http://strategis.ic.gc.ca/sc_mrkti/tdst/engdoc/tr_homep.html ; HS Codes of HCC121100 – "plants and parts of plants"

Table 7 - U.S. Imports of Medicinal Botanicals (Values in Canadian Dollars)

	1996	1997	1998	1999	2000	% of 2000 total	Cumulative %
China (excluding Mongolia)	35,048,369	42,885,261	55,206,345	55,356,889	52,773,999	31%	31%
India	35,436,304	59,811,505	51,794,187	30,260,766	42,752,067	25%	56%
Germany	11,741,664	10,201,992	14,526,494	14,304,074	9,430,156	6%	61%
Egypt	7,961,835	5,011,625	5,675,408	6,404,250	6,654,324	4%	65%
Italy	2,197,377	713,394	799,913	4,151,220	6,094,215	4%	69%
Mexico	5,045,072	6,001,262	6,225,696	6,211,436	5,101,392	3%	72%
Spain	2,699,324	3,005,135	3,023,442	2,852,455	4,071,743	2%	74%
Taïwan (Taïpei)	3,393,625	1,877,015	2,811,587	2,262,866	3,317,026	2%	76%
Albania	3,707,782	4,154,319	5,255,433	3,626,735	2,894,665	2%	78%
Chile	3,731,523	3,371,157	11,458,792	5,361,368	2,799,820	2%	79%
France	1,428,558	2,429,708	2,304,306	1,496,024	2,693,588	2%	81%
Brazil	1,920,922	2,749,075	2,639,635	3,311,590	2,585,494	2%	82%
Japan	2,606,715	4,501,730	8,595,647	2,441,104	2,232,003	1%	84%
Turkey	1,039,524	1,451,509	1,554,950	1,824,081	2,070,323	1%	85%
Singapore	0	11,916	47,505	3,566	1,907,579	1%	86%

Source: Strategis[18]

3.4 Canada

The Canadian herbal market operates at about one-tenth of the size of the US market. Consumer and industry information is scant; however, a Natural Health Products sector analysis by Agriculture and Agri-Food Canada as well as data provided by the Nonprescription Drug Manufacturers Association of Canada provide some data on market size and distribution.

According to the Nonprescription Drug Manufacturers Association of Canada, the total size of the Canadian herbal market is difficult to determine because of the extremely diverse natures of both the manufacturing and distribution sides of the market, but data suggests that in 1995, Canadians spent around $300 million on herbal remedies. Growth estimates at this time for the next year ranged from 20 to 30 percent in pharmacy and 10 to 20 percent in health food stores, giving a total market size of $340-375 million in 1996.

This market growth was supported by consumer data, which indicated that the use of herbal remedies among Canadians had been steadily increasing over the past three years. In fact, it has more than doubled since 1995. In that year, 10 percent of Canadians

[18] http://strategis.ic.gc.ca/sc_mrkti/tdst/engdoc/tr_homep.html ; HS Codes of HCC121100 – "plants and parts of plants"

indicated that they had used a herbal remedy (Reader's Digest/Roper Health Study, 1995) with 15 percent reporting usage in 1996, and 23 percent the following year.

NDMAC/ACNielsen Health*Vision* surveys have been tracking the trend: in 1996, 1 in 7 Canadians had used a herbal remedy; in 1997 this number jumped to 1 in 4; and in 1998, the number grew to 1 in 3. The most recent Health*Vision* survey indicates that this growth has leveled off at about 1 in 3 Canadians, mainly due to the fact that there were fewer new users coming on board in 1999 than in previous years.

3.4.1 Canadian Consumer Information

Participation rates of herbal remedy users generally rise as you go from the Maritimes (18%) to the mountains (29%), the most significant increase in herbal users (in 1997) was in Ontario where it grew by more than 88 percent. The Maritimes (67% growth), Alberta (51%), and British Columbia (44%) followed.

While females are the predominant users of herbal remedies (66% of all herbal users), the greatest growth is among males. In 1997, use among females increased by 38 percent, while the use among males increased by 96 percent. [19]

A CTV/Angus Reid poll, conducted in 1997, revealed the typical user of herbal remedies in Canada:

1) Residents of British Columbia
2) Females
3) Canadian aged 35 to 54
4) More affluent Canadians (52% among those with annual household income of $60,000 or more)

3.4.2 Sales Channels for Medicinal Herbs in Canada

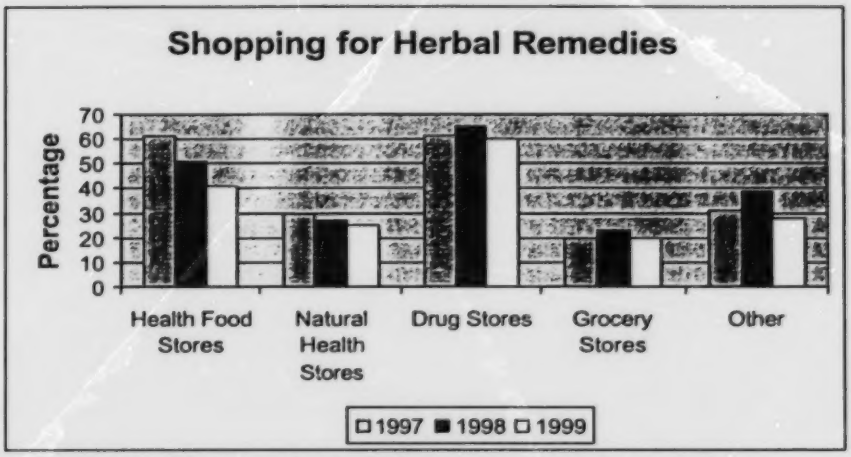
The sales channels used seem to differ between those who are first time herbal users and those who are long term users. In general, health food and natural health stores have seen a steady decline in the *proportion* of herbal users who are shopping in their outlets, whereas drug stores have seen growth. The NDMAC/ACNielsen Health*Vision* 1999 survey indicates that new users (individuals trying herbal remedies for the first time) will likely choose drug stores as their main point of entry.

New users are the individuals who have spurred growth in this sector. New users tend to rely on pharmacists, TV/print/radio advertising, and newspaper/magazine articles as information sources whereas long term users rely on health books. As such, long-term users use a greater variety of products, some of which may be more readily available in health food and natural health stores, and rely less on in-store assistance and media

[19] ACNielsen/NDMAC *HealthVision '96* and HealthVision '97

influence. In contrast, the new growth caused by the new users is being driven by the growing proportion of new users shopping at the pharmacy.

The Canadian Health Monitor reports that close to two-thirds of complementary remedies users purchase through pharmacy or drug store. A health food store was used by 29% of respondents and a supermarket, department, or discount store was used by 19% of complementary remedies users.[20] Research by AC Nielson and the Nonprescription Drug Manufacturers reveals that in 1996 with a market size of $375 million, $195 million was sold through pharmacies and $180 million sold through other channels.[21]



Source: The NDMAC/ACNielsen Health*Vision* 1999; Proportion of Herbal Use n = 3401

3.4.3 Trade

As indicated previously, under the "Harmonized Commodity Code," medicinal botanicals fall under the category HCC1211.00 – "plants and parts of plants…used in perfumery, in pharmacy or for insecticidal, fungal, or similar purposes, fresh or dried." The table below represents the total exports under this category.

The following table depicts the top 11 markets for Canadian exports of medicinal botanicals expressed in Canadian dollars. A total of 74% of the total exports in 2000 was exported to the US, followed by China at 13%.

[20] Canada Health Monitor #16
[21] Agriculture and Agrifood Canada , Canadian Health Food Industry Sector Analysis, p.25

Table 8 - Canadian Exports of Medicinal Botanicals (in Canadian Dollars)

	1996	1997	1998	1999	2000	% of 2000 total	Cumulative %
Hong Kong	58,281,792	44,512,145	49,770,474	38,782,193	32,538,320	74%	74%
China (including Mongolia)	784,638	5,264,926	6,537,538	3,122,287	5,647,836	13%	86%
United States (U.S.)	2,676,704	3,286,179	5,776,133	3,494,860	4,416,323	10%	96%
Taiwan (Taipei)	1,979,727	2,099,118	509,473	861,752	972,858	2%	99%
Singapore	1,936,151	2,019,269	541,888	960,319	340,970	1%	99%
Germany	246,907	374,606	505,734	554,102	114,222	0%	100%

Source: Strategis[22]

Since the Statistics Canada system of tracking imports and exports of medicinal herbs lacks refinement, it is not possible to obtain accurate figures on volumes and values of individual products. The only species at present that is segregated are licorice root and ginseng root – all other species are grouped under the category "not elsewhere specified" (HC1211.90). The following table reflects the exports of products not including licorice root and ginseng root.

Table 9 - Canadian Exports of Medicinal Botanicals (excluding ginseng and licorice root and expressed in Canadian Dollars)

	1996	1997	1998	1999	2000	% of 2000 total	Cumulative %
United States (U.S.)	1,160,904	1,377,976	2,443,775	2,125,691	1,705,589	71%	71%
China (including Mongolia)	23,265	144,781	33,172	0	437,198	18%	89%
Germany	211,648	354,995	505,734	514,811	114,222	5%	94%
Jamaica	0	0	10,403	74,570	62,657	3%	96%
Taiwan (Taipei)	0	0	0	0	35,402	1%	98%
Hong Kong	53,667	0	170,684	154,207	15,414	1%	99%
Italy (includes Vatican City State)	0	14,410	18,360	26,250	11,725	0%	99%
Australia	0	5,043	0	0	10,946	0%	100%
Austria	0	0	0	0	6,782	0%	100%
Libya	0	0	0	0	3,612	0%	100%
United Kingdom (U.K.)	6,638	0	387,131	136,067	558	0%	100%

Source: Strategis[23]

[22] http://strategis.ic.gc.ca/sc_mrkti/tdst/engdoc/tr_homep.html ; HS Codes of HCC121100 – "plants and parts of plants"

[23] http://strategis.ic.gc.ca/sc_mrkti/tdst/engdoc/tr_homep.html ; HS Codes of HCC121100 – "plants and parts of plants excluding licorice roots (HS = 121110) and ginseng (HS = 121120)

As the above table shows, the major market for medicinal products other than licorice root and ginseng root is the US.

The table below shows the exports of ginseng root with the major market being China.

Table 10 - Canadian Exports of ginseng (expressed in Canadian dollars)

	1996	1997	1998	1999	2000	% of 2000 total	Cumulative %
Hong Kong	58,228,125	44,512,145	49,599,790	38,627,986	32,522,906	78%	78%
China (including Mongolia)	761,373	5,120,145	6,504,366	3,122,287	5,210,638	12%	90%
United States (U.S.)	1,515,800	1,908,203	3,332,358	1,369,169	2,710,734	6%	97%
Taiwan (Taipei)	1,979,727	2,099,118	509,473	861,752	937,456	2%	99%
Singapore	1,936,151	2,019,269	541,888	960,319	340,970	1%	100%

Source: Strategis[24]

The table below shows the exports by province of ginseng root reflecting Ontario and BC being the major exporting provinces.

Table 11 - Canadian Exports of ginseng by province (expressed in Canadian dollars)

	1996	1997	1998	1999	2000	% of 2000 total	Cumulative %
Ont	51,694,138	39,938,057	36,896,342	22,921,016	24,857,375	59%	59%
BC	13,642,250	16,082,095	23,410,041	22,032,103	16,610,147	40%	99%
AB	129,778	10,061	420,102	78,558	342,282	1%	100%
PQ	923,912	19,611	582,563	82,648	0	0%	100%
NB	0	0	0	53,227	0	0%	100%
MB	85,776	23,189	0	0	0	0%	100%
NS	2,268	6,846	0	0	0	0%	100%
SK	185,862	0	0	0	0	0%	100%
PEI	2,742	0	0	0	0	0%	100%
TOTAL	66,666,726	56,079,859	61,309,048	45,167,552	41,809,804	100%	

Source: Strategis[25]

The following table depicts the top 15 markets for Canadian imports of medicinal botanicals including ginseng and licorice root expressed in Canadian dollars. A total of 37% of the total imports in 2000 was imported from the US, followed by China at 25%.

[24] http://strategis.ic.gc.ca/sc_mrkti/tdst/engdoc/tr_homep.html ; HS Codes of HS 121120 – "ginseng roots used primarily in pharmacy, perfumery, insecticides, fungicides or similar purposes"

[25] http://strategis.ic.gc.ca/sc_mrkti/tdst/engdoc/tr_homep.html ; HS Codes of HS 121120 – "ginseng roots used primarily in pharmacy, perfumery, insecticides, fungicides or similar purposes"

Table 12 - Canadian Imports of Medicinal Herbs (expressed in Canadian dollars)

	1996	1997	1998	1999	2000	% of 2000 total	Cumulative %
United States (U.S.)	11,661,446	13,062,544	16,778,537	18,026,959	17,865,979	37%	37%
China (including Mongolia)	12,269,078	11,268,451	13,983,562	11,899,617	12,065,582	25%	62%
Hong Kong	2,190,458	2,433,118	4,177,241	5,878,164	5,529,847	11%	73%
United Kingdom (U.K.)	78,380	77,041	288,906	310,035	2,501,146	5%	78%
France (includes Monaco and Andorra)	1,509,974	789,818	1,297,560	1,355,646	1,354,071	3%	81%
Turkey	804,569	830,439	1,088,889	1,076,280	1,300,685	3%	84%
Germany	1,193,850	980,445	1,189,092	1,130,662	1,069,604	2%	86%
India	684,172	602,214	669,069	1,155,569	790,790	2%	88%
Morocco	377,600	412,359	544,973	534,023	670,896	1%	89%
Korea, South	790,245	792,809	1,199,787	551,551	593,225	1%	90%
Mexico	134,522	148,328	311,602	258,138	568,270	1%	91%
Taiwan (Taipei)	206,793	91,234	127,351	797,868	543,264	1%	92%
Italy (includes Vatican City State)	1,995,928	2,880,205	928,487	704,090	423,492	1%	93%
Egypt	355,446	379,250	370,473	338,884	420,719	1%	94%
Re-Imports (Canada)	134,986	143,452	23,655	120,472	307,679	1%	95%

Source: Strategis[26]

The table below reflects that the US and China are the major source of imports of medicinal botanicals other than ginseng and licorice. This would include crops of interest to Saskatchewan such as Echinacea, St. John's Wort, etc.

According to a study done by Agriculture and Agri-Food Canada, "while data is unavailable at this point, industry participants contend that a significant portion of what is being imported in the form of raw material or finished products could be produced here in Canada."[27]

According to the same study, 70% of manufacturers in Canada were importing either natural health products or their ingredients. Of the manufacturers that are importing, 43% indicated they were importing 100% of their imported products or ingredients from the United States.[28]

[26] http://strategis.ic.gc.ca/sc_mrkti/tdst/engdoc/tr_homep.html ; HS Codes of HCC121100 – "plants and parts of plants"
[27] Agriculture and Agrifood Canada , Canadian Health Food Industry Sector Analysis, p.30
[28] Ibid.

Table 13 - Canadian Imports of Medicinal Botanicals (excluding ginseng and licorice root and expressed in Canadian Dollars)

	1996	1997	1998	1999	2000	% of 2000 total	Cumulative %
United States (U.S.)	940,6120	10,596,161	13,939,561	14,621,256	15,556,490	36%	36%
China (including Mongolia)	1,022,5938	9,396,055	11,976,874	10,601,952	10,712,192	25%	61%
Hong Kong	183,9460	1,833,817	2,657,705	5,030,398	5,079,735	12%	73%
United Kingdom (U.K.)	7,8380	76,851	285,636	300,072	2,495,316	6%	79%
France (includes Monaco and Andorra)	150,2368	787,556	1,117,631	1,333,222	1,353,914	3%	82%
Turkey	80,2432	829,555	1,087,074	1,069,925	1,297,706	3%	85%
Germany	119,3060	979,374	1,148,236	1,128,453	1,060,070	2%	87%
India	68,3843	599,051	667,636	1,148,320	784,350	2%	89%
Morocco	37,7600	412,261	544,973	528,956	670,896	2%	91%
Mexico	13,4522	148,061	309,262	257,465	568,270	1%	92%
Egypt	35,5446	379,250	369,436	337,288	420,494	1%	93%
Italy (includes Vatican City State)	199,5928	2,878,253	926,093	585,186	392,207	1%	94%
Dominican Republic	4,9274	56,499	62,071	116,753	240,588	1%	95%
Israel	22,3181	157,707	143,650	114,108	223,849	1%	96%
Indonesia (includes East Timor)	10,5132	212,346	204,146	149,678	209,561	0%	96%

Source: Strategis[29]

The following table depicts the distribution of exports of medicinal botanicals by province excluding ginseng and licorice root. Ontario accounted for 30% of the Canadian exports, Quebec 27% of the exports and Saskatchewan 19% of exports. British Columbia experienced a severe drop in value of exports falling from $1,886,628 in 1998 to $385,838 in 2000.

[29] http://strategis.ic.gc.ca/sc_mrkti/tdst/engdoc/tr_homep.html ; HS Codes of HCC121100 – "plants and parts of plants excluding licorice roots (HS = 121110) and ginseng (HS = 121120)

Table 14 - Distribution of Exports (excluding ginseng and licorice root and expressed in Canadian Dollars)

	1996	1997	1998	1999	2000	% of 2000 total
Ontario	601 111	770,776	554,330	543,962	716,741	30%
Quebec	347,368	593,006	539,926	887,798	653,479	27%
Saskatchewan	21,509	54,107	621,497	1,442,601	449,750	19%
British Columbia	475,445	462,558	1,886,628	915,087	385,838	16%
Alberta	15,295	0	16,871	238,899	161,195	7%
Manitoba	86,412	97,829	96,971	0	37,102	2%
PEI	0	0	0	90,026	0	0%
New Brunswick	4,806	2,616	0	0	0	0%
Newfoundland	0	0	0	0	0	0%
NWT	0	0	0	0	0	0%
Yukon	0	0	0	0	0	0%
Nunavut	0	0	0	0	0	0%
Nova Scotia	0	0	0	0	0	0%
	1,551,946	1,980,892	3,716,223	4,118,373	2,404,105	100%

Source: Strategis[30]

The Saskatchewan situation will be discussed in more detail in the Feasibility Section of the report.

3.4.4 Government Regulations

A study which was conducted in 1996 amongst the four jurisdictions of Canada, Japan, the European Union and the United States revealed that Canada had the most restrictive regulatory climate for the development and marketing of functional foods, taking into account federal law, regulation, guidelines and evaluation and licensing procedures governing production, manufacture, packaging, labeling and advertising of food products. Health claims associated with food products, even if known to be factual, are prohibited. The current system in Canada effectively offers manufacturers only the option of licensing the sale of functional foods as "drugs" as defined under the Food and Drugs Act, which is prohibitively expensive to all but a few Canadian firms. Even if a manufacturer has a health claim, which is known to be true, the claim cannot legally be used in Canada.

In the US specific legislation exists for approval, labeling and advertising of "dietary supplements" which may accommodate certain functional foods. Broader, basic food safety legislation governing approval of food products, additives and ingredients is also more adaptable to new products, technologies and advances in nutritional science. In addition, nutrition labeling requirements under the Nutrition Labeling Education Act

[30] http://strategis.ic.gc.ca/sc_mrkti/tdst/engdoc/tr_homep.html ; HS Codes of HCC121100 – "plants and parts of plants excluding licorice roots (HS = 121110) and ginseng (HS = 121120)

serve to promote consumer awareness of the attributes of specific food types and products.[31]

In the fall of 1997, a sector analysis study of the Canadian Health Food Industry was completed on behalf of Agriculture and Agri-Food Canada.[32] In addition to interviews and focus groups, a survey was distributed through the Canadian Health Food Association to over 3,000 businesses in the natural health products industry (retailers, wholesalers, manufacturers). There were a total of 302 responses to the survey. A second survey was distributed to the larger suppliers of natural health products, with 43 surveys faxed out and 9 returned.

The findings indicate that although the industry had experienced significant growth, and there was optimism for continued growth, the industry was experiencing significant domestic regulatory and policy hurdles. The study indicated that 40% of distributors in Canada import 100% of their imported product from the United States. The natural health products most commonly imported include herbs, supplements and bulk products.

A key point of the study is that natural health products should not be regulated as foods because they are taken for different reasons and not all products are recommended for general use by everyone. Similarly they are not viewed as drugs because they do not have the same risks and often are taken for different reasons.[33]

When an item is regulated as a food, no information can be provided about the product's use. As a result, natural health producers cannot tell consumers what a product's effect might be, when it should be taken, how much to take, or when it is not advisable to take the product.[34] When a product is regulated as a drug, it requires a drug identification number (DIN), a process designed for pharmaceutical products that are higher risk, with an expensive process to obtain. In a similar fashion, drug policies do not allow information about how a product can improve the body's function or structure or how it can help in the prevention of a disease or chronic condition.[35] One of the major ramifications is that the lack of label information is a risk to consumers, and can result in the purchase of inappropriate products.

The study points out that a significant portion of what is being imported in the form of raw material or finished products could be produced in Canada, but because of the regulatory environment, they can't be used in Canadian manufacturing.

A major disadvantage of Canadian produced product is the degree of restriction on the type of information that can be conveyed to consumers in advertising, particularly as it

[31] Smith, Marcotte, Harrison, A Comparative Analysis of the Regulatory Framework Affecting Functional Food Development and Commercialization in Canada, Japan, the European Union and the United States of America as reported in Journal of Nutraceuitcals, Functional and Medical Foods P.47-48

[32] Strategic Policy Choices & The Canadian Health Food Association, *A Sector Profile of Canada's Natural Health Products Industry*, prepared on behalf of Agriculture and Agri-Food Canada

[33] Ibid., p. 7.

[34] Ibid., p. 59.

[35] Ibid., p. 59.

relates to the health benefits of a given product. At the same time, cross border advertising from US firms highlight the health benefits of products, resulting in increased cross border shopping and US mail order purchases. [36]

Analysis done by the Canadian Health Food Association indicated that 42% of products offered by the typical US supplier are prohibited for sale in the Canadian marketplace by Canadian companies. [37]

The recommendations of the study called for:

- A separate framework for natural health products.
- The establishment of a new unit within Health Canada comprised of experts in natural health products.
- Appropriate protocols for assessment of safety in order to increase access to products with the burden of proof of harm to be placed on the new regulatory unit
- The adoption of revised Good Manufacturing Practices, which are appropriate for this industry.
- Lower regulatory fees recognizing the low risk nature of natural health products and the more efficient process offered by the new regulatory framework.[38]

In 1997, Health Canada responded to concerns by establishing an advisory panel to provide direction and advice. In November 1997, Health Minister Allan Rock asked the Standing Committee on Health to conduct a full public review and provide recommendations on the regulation of natural health products.

In 1998 the Standing Committee on Health delivered 53 recommendations in "Natural Health Products: A New Vision". In March 1999, the proposal for the creation of the Office of Natural Health Products was accepted. As a result, there are now three major divisions within the Health Protection Branch of Health Canada: Food Directorate, Therapeutic Products Directorate and the newly formed, Natural Health Products Office. In May 1999 the appointment of a Transition Team was made.

With the establishment of the Natural Health Products Branch of Health Canada, information on their program is available at www.hc-sc.gc.ca/hpb/onhp.

Currently no health claims are permitted on foods sold in Canada. Thus, claims may not refer directly or indirectly to the treatment, mitigation or prevention of any disease, disorder or abnormal physical state or any of the 46 diseases specifically listed in Schedule A of the Food and Drug Act.

The suggested regulations being proposed by the Natural Health Products Branch of Health Canada will be based on providing credibility to consumers of Canadian-produced products through Good Manufacturing Practices, the requirement for manufacturing

[36] Ibid., p. 44.
[37] Ibid., p. 46.
[38] Ibid., p. 7.

licenses and product licenses in order to provide assurance to exporters. Claims will be allowed that deal with treatment/cure, structure and function, and risk reduction claims.

Proposed provisions of the regulations will allow for historical, traditional and cultural uses of the product and require minimal evidence. Other than this category, the product registration process will need to be supported by appropriate evidence. For example, in the requirements for Traditional Herbal Medicines, the submission must include at least two traditional herbal references that indicate the reputed pharmacological actions/therapeutic uses for the part of the plant used, the dosage, and the product quality demonstrated by GMP compliance.

The Standing Committee on Health made 53 recommendations covering 16 broad areas. On March 26, 1999 the government accepted and agreed with all the recommendations and announced the creation of the Office of Natural Health Products, now the Natural Health Products Directorate (NHPD). Some of the more significant recommendations included:

- The need for an appropriate definition for natural health products.
- The creation of a new regulatory authority and structure to regulate natural health products, reporting to the Assistant Deputy Minister of the Health Protection Branch, Health Canada. An Expert Advisory Committee was established to help Health Canada and the Transition Team.
- To staff the new organization with personnel and working groups who have expertise and experience in natural health products.
- That all inspection personnel be specifically trained and that inspection of premises take place on a regular basis.
- The recommendation that any need to amend the existing Food and Drugs Act should not delay the needed regulatory and administrative changes.
- In response to the requirement to establish appropriate Good Manufacturing Practices, to include specific quality control and testing for these products and that manufacturers, importers and distributors of natural health products should be obliged to hold valid establishment licenses, the new Office of Natural Health Products will guide the development of appropriate manufacturing standards, the necessary requirements for licensing and development of appropriate training standards for inspectors.
- The Standing Committee recommended that manufacturers of natural health products be allowed to make health claims, including structure and function claims, treatment claims, and that Health Canada should assess these claims in a way that looks at types of evidence, such as professional consensus and traditional references, and not only at clinical trials. The label to clearly indicate the type of evidence used to support the

claim. In response, the Office of Natural Health Products will look at criteria to determine the applicability of claims, and guidelines determining the appropriate levels of evidence to support any claims made.

- The Standing Committee on Health recommended a pre-market approval process for natural health products, which would ensure that products are safe and that claims are supported by reasonable evidence. This process would be based on a risk management approach that recognizes that natural health products fall along a continuum of relative safety and therefore require different levels of control. This assessment would apply to pre-market licensing and post-market monitoring. Recommendation 30 suggested that certain lower safety products be made available to consumers with appropriate warnings, while other lower safety product might require practitioner intervention. The proposed regulations propose a sixty day licensing period, which if not informed on licensing, the product is deemed to be licensed.

- The Standing Committee on Health recommended that Health Canada immediately begin to encourage research on natural health products, the results of which should be widely disseminated to stakeholders and consumers. This could include studies focusing on the interactions of herbal products with conventional medications as well as studies that explore different uses by various groups in Canada. The response indicated that the Office of Natural Health Products will be responsible for supporting research in areas of epidemiology and social science research.

A 17 member Transition Team was appointed, with the Transition Team making recommendations for the government to make the shift from a disease-centered to a wellness-centered model for health care in Canada.

As part of the consultation process, Phase II is the Development of a Proposed Regulatory Framework for Natural Health Products. In March 2001, a draft set of regulations was released and is available on the Health Canada website: www.hc-sc.gc.ca/hpd/onhp/phase2_e.html. This proposed regulatory framework contains provisions for product and site licensing, good manufacturing practices, labeling and packaging. The attempt in these regulations is to find a balance between protecting consumers' concerns of safety and product quality, without being unduly restrictive.

Consultations are being sought to the end of May 31, 2001 on their proposed regulations. Informally, officials advise their target is a set of regulations to be at Gazette by March 31, 2002 and a second set of regulations to be at Gazette 60 days later.

A key element of the guidelines, is that once the NHPD have monographs, applicants can support the safety and proposed use (health claim) of an NHPD by simply referring the relevant monograph and attesting to conformity with it. Products without NHPD monographs, or products for which an applicant is proposing a novel claim would need to be supported by other material, such as literature reviews, expert opinion reports, clinical studies, etc.

It is proposed that for vitamins, minerals, homeopathic preparations, and botanicals being sold for their ***traditional use***, if the NHPD has not responded within 60 days of receiving the application, then the product will be deemed licensed. This provision is intended to balance the amount of regulatory review to the risk associated with various products. This will allow the NHPD to focus on new products, or current products being applied for novel uses, or the facilities in which the product is made. Traditional use means the following:

- In the case of a vitamin or mineral, use as a nutritional supplement.
- In the case of a homeopathic preparation, use as a homeopathic preparation, remedy or medicine.
- In the case of a botanical derived substance, use that is well documented, according to accumulated experience over an extended period of time.

The NHPD will develop "traditional use monographs" which will clearly show products and uses considered to be traditional.

In response to consumers concerns about the variability of the amount of medicinal ingredients found in the bottle compared to listed on the label, it is proposed that the same regulations would apply as found in the Food and Drug Regulations. For the majority of ingredients this would be plus or minus 10%, and for volatile ingredients it would be between 85% and 120%.

It is proposed that the regulations on labeling, amongst other factors, identify adequate directions for use of the natural health product, including any cautions, warnings, contra-indications or possible adverse effects associated with the natural health product. However, the draft regulations do not allow statement of health claims, as this remains under review.

3.4.4.1 Implications

8. With the changes in regulations, the industry is moved closer to a pharmaceutical approach, which we believe is good. This should enhance the ability of the pharmaceutical companies to buy in, as they already have the dollars and expertise to take advantage of the opportunities.
9. With the change in regulations, the industry will be impacted through 1) nutrition labeling, 2) standard testing procedures, and 3) GMP. The intent is to have a higher quality product, backed by credible regulation. In return Canadian suppliers and manufacturers are going to have to raise their level of expertise.
10. The new regulations ask that on the application for a product license, information will be required that supports the safety of the natural health product, including the raw material and finished product specifications. The issue of the costs of testing at the raw material stage as well as the finished product stage, will continue to make it more economically viable for manufacturers to buy from large suppliers rather than a myriad of small suppliers.

11. Although a site license will not be required for a grower or a retailer, unless the grower is also manufacturing, all other members of the distribution chain, such as manufacturers and distributors, will require a site license. Each member of the distribution chain will require Good Manufacturing Practices, which requires a certain level of sophistication and record keeping. This will create a hurdle for small operations to overcome, although it is badly needed in the industry in order to address the issues of consumer safety and product credibility. Many of the members of the distribution chain currently buy only on price, which explains the significant level of imports. With these regulations, quality will be stressed, which should encourage import substitution with Canadian produced product. The regulations are expected to negatively impact some producers who are currently processing, as they will have to use appropriate facilities. This, however, will encourage the serious processors to expand.
12. A phase in period is allowed for all aspects of the regulations, including obtaining a product license and obtaining a site license. The full benefits to the Canadian manufacturer and producer will not be felt until these regulations are fully implemented.
13. During the interviews, a major concern was expressed about the fact that research is lacking on what are the effective ingredients, and the synergistic impact of ingredients. The commitment to the monographs as well as the formation of the Canadian Network for Herbal Medicine Research will provide a concerted effort on providing the research, which will enhance Canada's and Saskatchewan's competitive position.
14. If the regulations allow Canadian product to make validated health claims this will allow Canadian-produced products to be competitive with US-imported products, and should allow Canadian products to be recognized as superior quality in the US market. In discussions with various individuals, there is a view that this will assist Canadian exports of manufactured product; however, it will be difficult for all actors in the distribution chain to measure up to these new standards.

At the same time as the regulations are changing, the Canadian industry is attempting to regulate itself in order to differentiate itself and therefore better compete. This should result in more consistency of testing procedures and thereby more consistency in results. We can rely on our traditional reputation as a leader in exports backed by science.

3.4.5 Quality Assurance Program

The Canadian Health Foods Association represents in excess of 1,000 members of which 400 are suppliers and 700 are retailers. The CHFA is developing and implementing an industry-led quality assurance program built upon three key factors:

- Growing customer and retailer demands that products are of a high quality and that what is on the label is in the bottle.
- More aggressive government implementation and enforcement of GMP's.
- Herbal growers and organic growers have begun to develop standards for quality assurance.

Open to CHFA members the applicants would have to provide proof of GMP compliance, agree to random product testing, random label formulation accuracy and random manufacturing facilities audits. In return companies who have qualified could use a logo demonstrating that the product has met the key quality-related standards.[39]

In discussions with Ann Wilkie of the Canadian Health Foods Association she advised that they have recently instituted random testing for label claims on four different products. The results are being released on a generic basis, but the intent is that by the end of June 2001 results will be released by brand. An issue that they are facing is that of validated testing methodology, that is, ensuring that the label claims are being tested fairly and accurately rather than arbitrarily.

The Canadian Health Food Association proposes the following components of a Quality Assurance Program:

- Code of Conduct
- Processing Standards
- Product Standards
- Trade/Consumer Complaint Mechanism
- Appeals Mechanism
- Education and Promotion

3.5 Science-orientated Global Market

Over the past few years, there is a definite trend to standardize extracts from medicinal herbs in terms of a single ingredient. Herbal medicines are being purified to certain stringent levels of standardized ingredients. The best selling products are now standardized to a specific marker chemical or active component, and the production of medicinal herbs is approaching pharmaceutical grade quality control, especially in Europe.

Herbal medicines now constitute a $ 3-4 billion market in North America. These preparations are readily available, in Canadian health-food stores as well as supermarkets and pharmacies, at relatively cheap prices, and are sold for the treatment of numerous diseases. Many herbal medicines are allegedly designed to combat cancer and infectious diseases, and/or to " stimulate/boost the immune system". Some of them are now being added to foodstuffs and other products that are not directly involved in health-care. In addition some may be used inappropriately, or in combination with other medications.

In spite of their popularity and the numerous claims of efficacy found in popular and academic literature, no one really knows how herbal medicines work. Western medical practitioners and scientists are generally skeptical about these preparations, which have seldom been subjected to rigorous scientific analysis or controlled clinical trials.

[39] Ibid., p. 56.

Furthermore, studies that have been done in foreign countries are largely unknown to Canada, as they are published in foreign journals, which are seldom translated into English.

Furthermore herbal medicines frequently contain multiple bioactive ingredients with potentially multiple modes of action; but the products in the marketplace are not necessarily derived from authenticated or consistent sources, and their chemical compositions vary accordingly. It is suggested that these preparations be subjected to rigorous scientific evaluation.

The industry has also been plagued with fraudulent products as illustrated in a Toronto Sun January 15, 2000 article entitled "Blind Faith – Herbal Cures" which describes products being sold that have not been adequately tested or regulated.

The consumers and the health system are requiring objective scientific analysis of herbal medicines to determine:

- whether there is a real basis for their purported health benefits,
- in detail how they work,
- what the active ingredients are, and how multiple activities work in concert, and
- that they can be taken safely without side effects and possible interactions with other medications, and to derive a program of quality control and analysis.

3.5.1 Canadian Network for Herbal Medicine Research

The mission statement of the Canadian Network for Herbal Medicine Research is to establish, with the aid of new and emerging technologies, the Canadian Network for the scientific evaluation and application of herbal medicines, and to become a world leader in the field.

The network is comprised of more than 20 Canadian scientists, from various Universities, Institutes and Government Laboratories, together with representatives of the private sector, who share a common interest in promoting the scientific evaluation of herbal medicines and in solving important issues concerning their production and consumption.
The focus on herbal medicine research will be on herbal products that are claimed to possess "anti-infectious", "anti-cancer", "anti-diabetic" and/or "immune-modulating" properties.

The information derived from these studies will be available to Canadian consumers, companies and organizations interested in processing and marketing herbal products, and to health practitioners and pharmacists.

3.5.1.1 Objectives

The objectives of the Canadian Network for Herbal Medicine Research are to:

- evaluate scientifically the use of herbal medicines for applications to specified diseases,
- elucidate their mechanisms of action,
- evaluate their safety (in connection with side effects, possible toxicity, and drug interactions),
- establish criteria for their standardization and application, and
- attempt to improve their formulation.

The pressure to have herbal medicines tested for dose, efficacy, and duration are coming from three sources: industry, consumers, and medical professionals.

The herbal industry wants:

- contact with research scientists interested in herbal medicines,
- scientific validation of herbal products,
- a scheme for appropriate standardization and quality control,
- guidelines for the possible improvement of the products, and
- prospects for marketing high quality, defined products.

The consumer wants:

- validation of the efficacy of the product,
- assurances that the products, at their recommended dosage levels, really do work as claimed by the manufacturers, and
- assurances that they can be taken safely, both individually and in combination with other medications, such that possible contraindications are recognized and defined.

The medical profession wants:

- clear scientific and clinical evidence, based on acceptable laboratory and clinical practices, showing that standardized herbal medicines do work as claimed, and that contraindications are recognized and defined.

3.5.1.2 Current Participants

Project Leader: Jim Hudson, Professor, University of BC

Researchers from the following Universities:

- Brandon U; Carleton U; McGill U; U of British Columbia; U of Montreal; U of Ottawa.
- Pacific Agri-Food Research Centre (Agriculture & Agri-Food Canada - Agassiz & Summerland sites, BC.).
- Health-Canada, Ottawa.
- BC. Ministry of Agriculture, Food & Fisheries.

- Prostate Research Center, Vancouver Hospital.
- Center for Integrated Healing, Vancouver.
- Center for Indigenous People's Nutrition and the Environment (McGill U).
- Equine Research Center Inc. (University of Guelph).
- Hedron Analytical Inc. Vancouver.
- Herbon Naturals Inc., Richmond, BC.
- Kinexus Bioinformatics Corp. Vancouver.
- Plantae Technologies Richmond, BC.

From a Saskatchewan point of view, the fact that there is no Saskatchewan representation on this Committee is of major concern. The omission does not recognize the very significant expertise in the natural health products area that exists in the province. Involvement in the Committee would provide Saskatchewan access to the findings and leading edge developments.

3.6 Controlled Environment Production

There are two types of controlled environment processes. The first is called in vivo, which means "to grow under glass" and involves cell culture production which provides the ultimate in consistency of ingredients, as each plant is identical. In vivo is strictly grown in a controlled environment from plants reproduced not by cell culture but by tissue culture. Both types of production are focused on the effects of the environment on the plant whereby in the end each plant will have a specific set of optimal conditions for its growth.

The idea behind this production is that herbs are not like vegetables. They are medicines and should be treated as such. This faction of the industry believes that growing herbs in the field is not ideal and that they should be grown in a controlled environment in a large sterile chamber. They stress that it needs to be kept in mind that medicine has an activity and side effects. It is not a food; rather, it is a pharmaceutical. There have been cases where material has not been washed, for fear of destroying the active ingredients.

Organic farm production is viewed by this faction as strictly a marketing tool. In fact, organic production is viewed as often worse. Much of the ginseng grown in Ontario is grown on land that was heavily sprayed for tobacco growing. Furthermore, organic herbs often have grey mold, or penicillin in them. As stated by the department of Plant Agriculture, Biotechnology Division at Ontario Agricultural College, "Nothing is truly organic unless it is grown in a controlled environment."

3.6.1 *Benefits*

The benefits of growing herbs in a controlled environment are:

- The ability to fully control growing conditions in order to obtain predictable and consistent quantities of the desired active ingredients.
- Healthy plants without resorting to the use of pesticides or fungicides.
- Contamination-free plants (no pollination, no plant disease, filtered air system, consistently monitored for nutrient levels and lighting).
- GMP and process auditability for regulatory approval and for product liability insurance purposes.
- The ability to create a wide range of growing conditions, some of them exotic, in order to grow a wide range of herbals without having to import them from all parts of the world.
- A propagation and growth process that can be scaled from the laboratory to commercial production under regulatory scrutiny and approval conditions.
- Avoids natural sources from being depleted and valuable plants from becoming extinct.
- Yield is reported to be ten times greenhouse production, on a per square foot basis, and insulated from natural gas prices.
- In the case of in vivo production, which is much more expensive, it is viewed that the higher quality should afford higher prices.

They see the new regulations as being supportive of their view.

3.7 Synergistic Argument

The synergistic argument basically relies on the idea that herbs are not drugs and should not be treated as such. Variations in compounds from plant to plant are not seen as major issues and this faction believes that there is too much emphasis on active ingredients. Furthermore, after a blending process, the plant compounds will not be different. The emphasis, in this case, is on the whole herb.

3.7.1 *Chinese Medicinal Herbs*

A discussion with Jean Giblette of High Falls Gardens in New York state, a grower who has been working with Chinese herbs, believes in the synergistic faction of the industry. She is currently working on a national approach to the cultivation of Chinese herbs. Manufacturers of Chinese herbs are usually dealing with imported Chinese herbs and have been victim to adulteration and poor quality. As such the approach taken by Jean is such that a potential market exists here for Chinese herbs grown domestically which can guarantee practitioners superior quality.

Chinese herbal traditions rely on the whole herb and believe that if one herb is slightly toxic, another herb will buffer this. It is a mixture of herbs that is used in a formula to derive health benefits. Processing is based on traditional methods and includes drying, grinding and frying with specific substances.

Jean is working with other growers across the US and conducting production trials to determine if the herb can be grown. Given that the US has variable weather from the southern to northern states it is believed that a significant number Chinese herbs used in these formulae can be cultivated.

3.8 Specific Herbs in the North American Medicinal Herb Market

3.8.1 Top Selling Medicinal Herbs

The following highlights the best selling herbs in mass market and natural foods markets. Sales growth for herbs sold in the mass market have been substantial whereas sales in the natural food market channels are largely unchanged. See Table 4.

Growth rates in the mass market sector has been phenomenal because of positive press and the entry of major multinationals demonstrated by the over 100% increase in more traditional products such as Echinacea, Gingko, and Saw Palmetto.

Table 15 - Ranking of US Herbal Supplement Sales 1997-98 for the Natural Food Markets

Botanical	1998 Rank	1997 Rank	Percent of Sales	
			1997	1998
Echinacea	1	1	12%	10%
St. John's Wort	2	17	2%	9%
Gingko	3	3	7%	7%
Garlic	4	2	9%	7%
Saw Palmetto	5	5	5%	5%
Asian Ginseng	6	6	5%	4%
Goldenseal	7	4	6%	4%
Aloe	8	6	5%	4%
Siberian Ginseng	9	11	3%	3%
Valerian	10	18	2%	2%

Source: Rural Industries Research and Development Corporation - Australia[40]

In the natural food market channels, which largely pre-date the mass market channels, ten botanicals account for just over 50% of total sales – a figure which was unchanged over the 2 year period.

[40] http://www.rirdc.gov.au/reports/EOI/00-51.pdf; page 17

3.8.2 Emerging Herbs

According to one interviewee, identifying emerging herbs is equivalent to using a crystal ball. However, emerging trends can be identified and herbs identified which may become potential growth herbs. The trends identified include herbs for women issues, aging issues, cardiovascular system, and stress.[41]

3.8.2.1 Herbs for Women's Issues

An increasing number of postmenopausal women are opting for alternative remedies to estrogen replacement therapy due to estrogen's link to breast cancer. Many postmenopausal women can't take estrogen, fear its link with breast cancer, or simply prefer a different approach. Many women are interested in learning about ways to quell the symptoms of menopause – hot flashes, sleep disturbances, urinary incontinence, mood swings, forgetfulness -- without taking exogenous estrogen. Another reason women seek non-hormonal treatments is to approach the menopause in a "natural" way. Furthermore, the symptoms of menopause: anxiety, depression, back pain, and chronic fatigue are the four conditions for which, collectively, more than one in three U.S. patients use unconventional therapy.[42]

Alternatives being explored include the following:

[41] Nutrition Business Journal, October/November 1999; page 13

[42] http://altmedicine.about.com/health/altmedicine/gi/dynamic/offsite.htm?site=http%3A%2F%2Fonhealth.webmd.com%2Falternative%2Fin-depth%2Fitem%2Fitem%2C99726_1_1.asp

Herbs used to Treat Menopause Symptoms[43]

Estrogenic herbs: Anise, black cohosh, chasteberry, dong quai, fennel, ginseng, red raspberry leaf, sage

Progestogenic herbs: Mexican wild yam root, sarsaparilla

Herb	Uses
Black Cohosh[44] *-roots*	Black cohosh root is used internally in liquid form to help chest problems, coughs, diarrhea, and irregular menstruation. It is also known for female reproductive problems such as amenorrhea, dysmenorrhea, menopausal symptoms such as debility, depression, and hot flashes, and childbirth.
Sage[45]	Dried garden sage (Salvia officinalis), which contains natural estrogens. Herbal mixtures in OTC tablet form have also become popular for the treatment of menopausal symptoms.
Valerian[46] *-roots*	Used as an OTC tranquilizer in Europe; listed as antispasmodic; can be used for menstrual pain. It has been drunk in tea for the treatment of anxiety, and bedtime administration of 400 mg of the standardized tincture extract or 2.5-5.0 mg of the solid extract is used to ease insomnia.
Red Clover[47] *- flowers*	Red clover, a member of the legume family, is rich in phytoestrogens compounds that function like estrogen in the body, and is one of the few plants that contain all 4 types of isoflavones. It's also high in bioflavonoids. Because of all of these characteristics it is thought to help in alleviating a number of perimenopausal and menopausal symptoms like hot flashes, night sweats, and other symptoms linked to estrogen levels.
Cranberry[48]	Helps prevent urinary tract infections, caused by E. coli bacteria; added to foods for flavoring.
Noni[49]	Treat premenstrual syndrome, chronic fatigue syndrome and arthritis.
Stinging Nettle[50] *-leaf, young shoots, underground stem, roots*	Blood purifier and treatment for internal bleeding and excess menstrual flow.

[43] http://my.webmd.com/content/article/1680.51466

3.8.2.2 Herbs for the Aging

Herb	Uses
Green Tea[51]	Anti-oxidants slow or prevent oxidation within our bodies by removing free radicals that cause damage to, tissue loosening, genetic damage and the promotion of disease and aging.
Grape Seed Extract[52]	
Ashwaghanda[53]	
Sage[54]	
Turmeric[55]	
Feverfew[56]	natural anti-inflammatory properties
Boswellia[57]	used to fight arthritis, osteo-arthritis, and rheumatoid arthritis because of its natural anti-inflammatory properties (used on dogs, cats and horses as well).

The top two herbs for antioxidant activity are green tea and grape seed extract. Other herbs to look into are rosemary, common sage, and soy.

3.8.2.3 Herbs for the Cardiovascular System[58]

One in four Americans have some form of cardiovascular disease. It is the leading killer of women and half of all deaths from heart attacks in the US are in those under 65 years of age. With the aging of the baby boomers it is predicted that the market for herbal treatments for these problems will increase.

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[44] http://www.ncpmh.org/blacoh.html
[45] http://www.herbnet.com/sage.htm

[46] http://www.1001herbs.com/valerian/
[47] http://www.eastearth.com/products/red_clover.html
[48] http://www.herbs.org/current/cranuti.html
[49] http://www.fintrac.com/rap/news/archive/v41/herbal.html
[50] http://www.sbherbals.com/121999HotM.html
[51] http://herbsforhealth.about.com/health/herbsforhealth/library/weekly/aa021201.htm?terms=aging
[52] Ibid
[53] Ibid
[54] Ibid
[55] Ibid
[56] http://www.kcweb.com/herb/feverfew.htm
[57] http://www.fintrac.com/rap/news/archive/v41/herbal.html
[58] http://herbsforhealth.about.com/health/herbsforhealth/library/weekly/aa011600.htm?terms=cardiovascular

Herb	Uses
Hawthorn	Widely used by herbalists around the world for cardiac problems. Scientists have discovered that hawthorn dilates blood vessels allowing blood to flow more freely and thereby lowers the blood pressure. It also acts directly on the heart muscle to help heal damaged heart tissue.
Motherwort	Has been traditionally used to strengthen heart function.
Garlic (Allium)	Has the potential to lower blood cholesterol, pressure and generally improving overall cardio-vascular system.
Night Blooming Cactus	Contains cardiac glycosides and is used as a heart tonic and restorative.
Ginkgo	The most popular herbal food in Germany and France, outselling other herbal products by 20 percent. For years ginkgo has been used by herbalists worldwide. Ginkgo contains flavonoid glycosides like quercetin. Quercetin is the "magic" ingredient in red wine that helps protect the French from heart disease. It helps prevent heart attack by preventing cholesterol oxidation.

3.8.2.4 Herbs for Weight Loss[59]

Although the view of many in the industry is that herbs used for weight loss are usually promoted by "substandard manufacturers," it is believed to be a growth-market for herbs according to an article in the Nutrition Business Journal. With fen-phen off the market, "natural" diet aids are the new rage. In fact, a manufacturer offers a product called Phen Free. It contains standardized herbs that are designed to support thermogenisis (the process by which the body generates heat energy that burns fat).

Some other herbs (without detailed scientific agreement) can be found in diet or metabolism formulas, which may stimulate sluggish metabolisms for people who are overweight:

Herb	Uses
Cinnamon	Stimulant, carminative
Cayenne	Stimulant, circulatory tonic
Mustard	Stimulant
Ginger	Stimulant, carminative
Guarana	Stimulant
Ginkgo biloba	Circulation

[59] http://herbsforhealth.about.com/health/herbsforhealth/library/weekly/aa010299.htm

3.8.2.5 Herbs for Stress[60]

Herbs for stress were also identified as another growth area for herbs. The following table lists herbs that have been claimed to help people handle stress.

Herb	Uses
Chamomile	An antispasmodic making it great for cramps and indigestion.
Catnip	Catnip is carminative for the digestive system and mildly sedative. According to Rodale's Illustrated Encyclopedia of Herbs, a major component of catnips volatile oil is structurally similar to valerian.
Valerian	This is an antispasmodic and sedative. A stronger central nervous system depressant. Can be very addicting!
Kava	It is stimulating and depressing, sedative, muscle relaxant, narcotic, diuretic, anti inflammatory, help relieve insomnia, pain reliever, local anesthetic, aphrodisiac.
Scullcap	Sedative, nerve tonic and antispasmodic.
Lousewort, Wood Betony (Pedicularius)	Calmative
Hops	Sedative. Studies on small animals confirm hops depress the central nervous system.
Passionflower	Used for tension, fatigue, sleeplessness and muscle spasms.

3.8.2.6 Blends

Blends are becoming increasing important in the marketplace, and are estimated to account for one third of business on the shelves. [61] The multi-herbal is emerging as a significant category and growing such as Echinacea/Goldenseal combinations and formulas to lower cholesterol.

Studies on Goldenseal show that it acts as an astringent, producing a vasoconstriting effect. Goldenseal's astringent ability enables it to help tone mucus membranes, which in turn, aids stomach and intestinal disorders, prostate and vaginal complaints and stops internal bleeding and prevents hemorrhaging. It is becoming difficult to define individual ingredients.

3.8.2.7 Pet Supplements

An area that may offer relief to the current glut of production in the market is the animal segment. The human market is saturated and companies are diversifying into animal industries particularly the horse and dog segments. A survey by Strategic Equine Marketing revealed that horse owners indicated unanimous interest in more research on the efficacy of alternative therapies, and all participants in the survey indicated they

[60] http://herbsforhealth.about.com/health/herbsforhealth/library/weekly/aa102497.htm
[61] Ibid.

would use "the same or less drugs in the future with their horses" based on improved husbandry and increased natural products and therapies.

Industry participants who were interviewed cited that this is the next major growth area. According to Steve Wrick, of Sold Gold Health Products for Pets Inc., the total pet food business in the world is approaching $25 billion a year. The US pet food business is estimated at $11 billion with the premium end of the market growing the fastest. The premium end is estimated at 10% of the market. On the supplement side, herbal remedies are estimated to account for $3.2 billion in sales per year worldwide.[62]

An organization called the Nutraceutical Alliance, a research and information source, was developed to deal with medicinal herbs for animals. The Nutraceutical Alliance has three objectives:

- To conduct scientific research on NHP's for animals,
- To work with industry leaders and regulators to help foster high quality product development and responsible ethical commercialism, and
- To facilitate maturation of the industry by providing detailed research information and education services.

However, regulations are limiting this market as distribution or selling of the product is difficult. Right now it must be either a feed or a drug. There is no third classification to deal with herbal supplements and animals. BVD (Bureau of Veterinarian Drugs) regulates drugs, CFIA (Canadian Food Inspection Agency) regulates foods, and the AFCO (Association of American Feed Control Officials) is the umbrella organization of the BVD and CFIA. The AFCO is the regulatory body and had committees to look at natural products in animals however this has been disbanded and research destroyed. The interviewee revealed that this was probably to avoid litigation.

Further limitations include the lack of infrastructure. For example, according to Wendy Pearson, Director of the Equine Research Center at Guelph Ontario, Echinacea, a crop showing great potential in the Equine Industry, was not supplied by Ontario growers despite the availability of the crop in the province. This was due not only to the lack of a regulatory framework but also to the lack of processing facilities and support systems for quality control.

As well, a lack of research is limiting the market. As an example of the need for species-specific research (i.e. "this is for a horse"), 0.5 mg/g of Echinacea is required for a human and 6 mg/g is needed for a mouse. How much would you give a horse? The industry needs research to determine optimal dosage.

3.8.2.7.1 Example of Market Potential

Pet Products - United States Market

- 65% of the U.S. population owns a dog, cat, bird or horse.
- 66.1 million people own cats and 58.2 million people own dogs.

[62] Nutrition Business Journal, March 2000, P. 14.

- 12.7 million people own small animals such as rabbits, ferrets and rodents.
- 21.3 million people own birds.
- 10.8 million people own fish and 7.5 million people own reptiles.
- 22.5% use at least one type of natural pet care product. Use is evenly divided between foods, supplements and pet care products with 14% each.
- 27.3% are considering using a natural pet care product.

Source: *Whole Foods Magazine*, July 2000

3.9 Marketing Medicinal Herbs

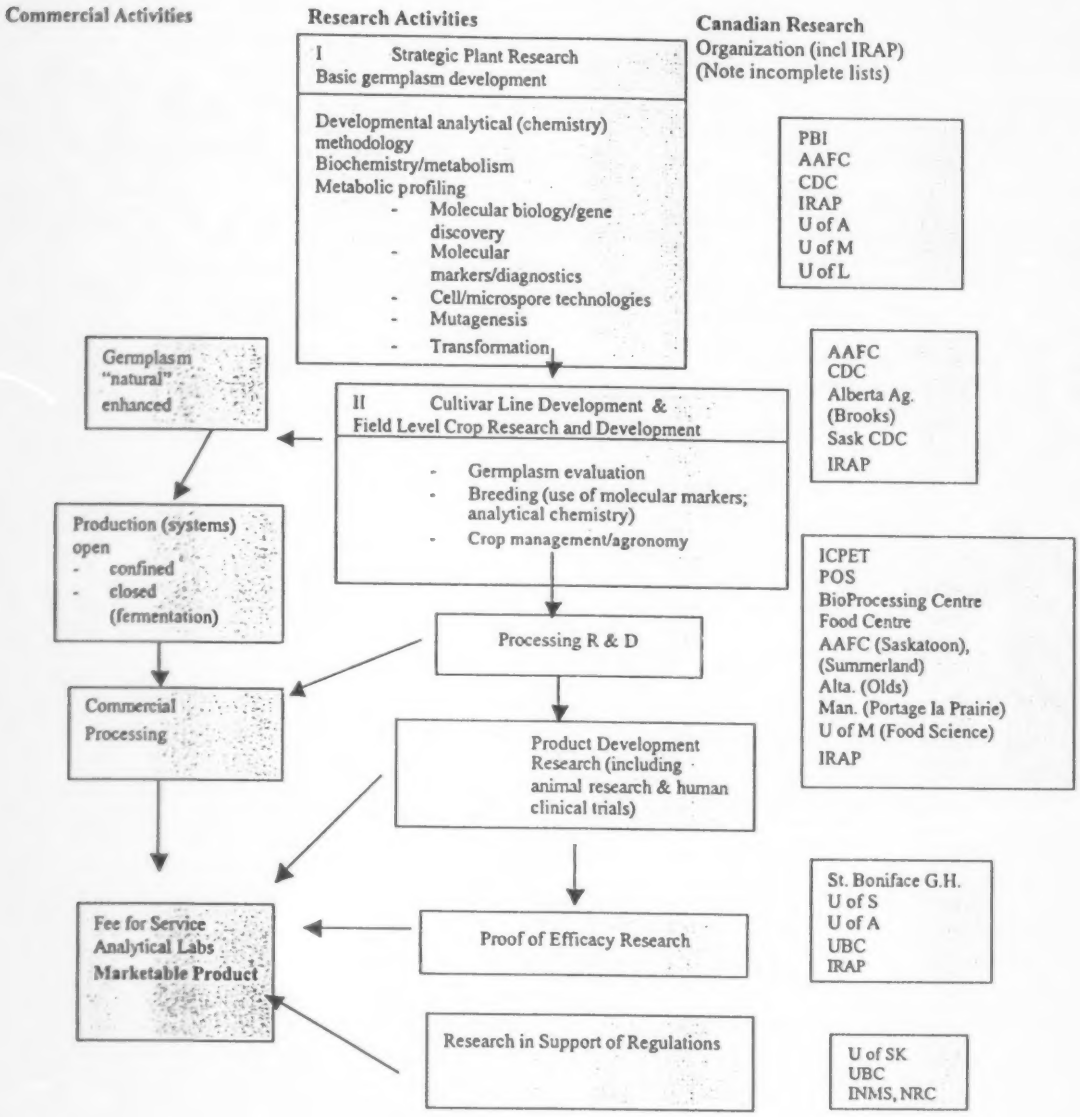
An interview with a local manufacturer of medicinal herbs indicated that "marketing the products is tough. It is very difficult to compete. We need 5 or 6 companies to come together and use a label or brand name to market the product successfully." This was confirmed by an interviewee in Ontario, who stated that successful marketing in the industry is contingent on three issues:

- Creating brand names through published science
- Sales (prices)
- Regulations (safety and efficacy)

First, in regards to published science, dosage, duration and efficacy needs to be researched. Currently the herbs are only described by their effect on "normal healthy people" even though it may be proven to be beneficial to someone with a specific condition. Furthermore, the criteria used for determining whether a claim can be made does not always incorporate everything, for example, the lowering of blood cholesterol. This is seen by many as a result of control by the drug manufacturers and is preventing the potential of low cost health care in Canada. Botanical treatments for various conditions generally cost less than half of the equivalent pharmaceutical product – ten cents per day for valerian as a sleep aid, a dollar daily for typical saw palmetto treatment for prostate problems.

Also, as a result of these restrictions, many US companies are choosing not to sell herbs in Canada, which is a detriment to Canadian consumers. The following chart outlines an industry flow chart for creating a marketable product.

3.9.1 General Industry Flow Chart (Creating a Marketable Product)



Source: Saskatchewan Nutraceutical Network (SNN)

3.9.2 *Brand Name Creation through Published Science*

One way to market a product, given the restrictions on medicinal herbs, is to use science to publish a brand name. An example is Ocean Spray cranberry juice, which is known to fight Urinary Tract Infections. The cost of the process was the study itself at approximately $100,000 plus $15,000 for a clinical study. If producers could get together and come up with a common brand name and do a study and trials, this gives them 1) a lead in the marketplace and 2) wonderful advertising.

Although this strategy is open to all growers and processors, ironically, it is predicted that in all likelihood, the group to benefit from this approach will be the pharmaceutical companies. In Germany, pharmaceutical multinationals forged alliances or bought out botanical medicine companies in order to participate in the consumer trends toward "natural" medicines. These same trends are happening in the US and Canada with Bayer, the producer of One-a-day vitamins and minerals blending it with herbal ingredients. It is predicated that Pharmaceutical companies will buy up the small herbal companies, as they will be looking for a direction on these products. As well, they know how to buy the market and have the infrastructure to do so.

3.10 Buying Criteria

3.10.1 *Price versus Quality*

Raw material suppliers and manufacturers were interviewed to determine the criteria used in purchasing raw materials, and although a number supplied a portion of their volume from their own farms, the primary determinant was price.

One raw material supplier stated that, "in general, manufacturers will buy on price, even the well known brand name manufacturers". Another raw material supplier stated that it depends on the market. He stated that "in Germany and France where herbs are treated more as a drug, you will look more closely at active ingredients, however, in Canada and the United States, where it is treated like a food, you may just look at cleanliness."

Another raw material supplier summarized the situation as follows: "I have purchased two herbs from Canada, Echinacea purpurea plants and sea plants, and have been very impressed with the quality. However, due to the glut in the marketplace and the competitive nature of the industry, I can buy them cheaper and of similar quality from other sources." Furthermore, buying in small amounts from far away does not make financial sense with shipping, and many try to buy locally if possible.

In terms of quality, some purchasers say that they do not buy raw materials from Canada because the desired herbs do not grow to their natural maximum potential in our region.

They prefer to buy where the species is found naturally. Extractors say that there are some issues with Canadian root crops and that there is too much fungicide use on some crops to be acceptable in this market. However, it cannot be verified if this is true and constitutes a non-tariff trade barrier for the purchasing of raw materials. Concerning the use of fungicide on ginseng and the reluctance of US companies to purchase for that reason, Dr. Chung Ja Jackson, of the University of Guelph, Laboratory Services, is doing the research to test this, as the fungicide is used only in the second year and is not viewed to be an important issue.

A majority of companies do purchase their raw materials from India and China. They are large suppliers due to the low costs and large quantities they supply.

3.10.2 Required Form

The raw material suppliers were asked in what form they required the raw material. Majority of those interviewed did not want it in bulk form. They want a diverse line of products to offer manufacturers including powdered, teas, and standardized extracts. Manufacturers will want it in this form as this reduces their freight costs and the raw material suppliers need to be able to delivery the product with a lead-time of not more than two weeks. This lead-time makes it difficult for any processing to take place at the raw material supplier stage. The processing needs to take place prior to being sold to the raw material supplier.

In fact, the primary reason the raw material suppliers did not purchase from Canada is because of the lack of processing available in Canada. Growers can do some of the processing on their farms in terms of pressed oil, grinding and milling; however, herbal extracts or concentrated active compounds are more difficult to purchase in Canada. Another raw material supplier stated that it was too expensive for a grower to get it milled and have any return on their production.

Another issue identified by a raw material supplier was testing of raw materials. Testing procedures in Canada make it very difficult to buy raw materials. According to this raw material supplier, the results of Canadian laboratories are never consistent. If you send a sample to 5 different labs you will get 5 different results. Furthermore, the testing in Canada is very expensive creating an environment for growers to be uncompetitive in the marketplace. Raw material suppliers can buy products that are already tested from the US cheaper, even with the weak Canadian dollar. Only for use in horse feed will they buy directly from growers.

Raw material suppliers and manufacturers typically have repeat suppliers and as a result reduce the chances of there being quality issues. For new suppliers, however, they will require a sample and all the certification the grower has for the product. This still does not guarantee a sale, as it will then be checked in-house and either denied or confirmed. Currently, there is no procedure for testing the organic qualities of herbs.

Of the raw material suppliers interviewed, only one mentioned that they want the crop in a whole form so that they can have the option of powdering or extracting.

3.10.3 Market Presence

Other purchasers stated that they would have no issues buying from Canada and the quality is well known; however, no one has approached them to buy Canadian product. This means that producers must try to build relationships with people who will buy their product.

A raw material supplier stated that Canadian suppliers do not make themselves known to the end users. It was suggested that the suppliers make themselves known through trade shows particularly the Supply Side East and Supply Side West trade shows http://www.supplysideshow.com/exhibitors.html, which is primarily for raw material suppliers.

3.11 Products Supplied by Canada

Interviews with individuals at the Natural Products Trade Show revealed that Echinacea, Goldenseal, and Ginseng are the most common herbs supplied by Canadian growers to the raw material suppliers or manufacturers in the U.S. Smaller quantities include: St. John's Wort, Yarrow, Valerian, Milk Thistle, Goldenseal, burdock root, and dandelion.

3.11.1 Reasons for Supplying outside Canada

3.11.1.1 Quality

A local Saskatchewan manufacturing company indicated that it was sourcing some of the Echinacea from outside the country, specifically North Dakota, where the quality is double that of Echinacea produced in Saskatchewan.

3.11.1.2 Lack of Processing

Growers can do some of the processing on their farms in terms of pressed oil, ginding and milling; however, herbal extracts or concentrated active compounds require greater expertise and equipment and are more difficult to purchase in Canada. In addition, as has been mentioned already, the high cost of milling may significantly reduce the return on production for growers.

In Saskatchewan there appears to be different views on the capabilities available in the province. POS offers the ability to do alcohol and solvent extraction at a pilot plant level, but not super critical extraction with CO2. The Bio Processing facility at Innovation Place can do the same processing on a larger scale but with the added capability of

distillation to capture the alcohol. However, both facilities are weak if powders are required needing spray or freeze-drying.

Complaints were heard that the POS pilot plant is designed for R&D and manufacturers can end up losing a significant percentage of the active ingredients. On the other hand, the Bio Processing facility is too large and it is just not economical to use in the extraction process. We were told that manufacturers in Saskatchewan may be tempted to buy powder from outside the province as it can be processed cheaper than buying the herb in Saskatchewan and having the processing done at either POS or the Bio Processing facility.

In discussions with people who have expertise in this area, they view that it should be possible to extract 90% of the desired compounds with the alcohol extraction. If the active ingredient is being lost it may mean the processing parameters need to be examined. If less than 90% of the product is being extracted it may be the result of inconsistent raw materials.

3.11.1.3 Production Size Availability

There is a need to consolidate production, as buyers do not want to pay for certificate of analysis on small lots.

3.11.1.4 Cost of Testing

Raw material suppliers can buy products from the US, already tested, cheaper than from Canada, even with the weak Canadian dollar.

Strategic Importance

- The changes in regulations are believed to be positive to Canada's growing medicinal herb industry. The structure will be there to present an image of quality and safety to North American and overseas markets.
- The writer believes that many parallels can be made between the canola industry of the early 1970's and today's Saskatchewan herbal industry. Almost shut down by impending regulations on levels of eruric acid content, the universities, federal research institutions and industry worked together to develop varieties which through science showed the new varieties addressed the health issues of the day. The industry also worked together at all levels on issues related to regulations, transportation policy and market development. The result today is an industry of vital importance to the Saskatchewan economy.
- Consumers are interested in herbal medicines but want assurance of safety and quality. The negative press being received by the herbal industry is believed to be a major reason why growth is stalling.
- Pharmaceutical companies worldwide are feeling the impact of herbal therapies as demand for natural products increase, and traditional market share is impacted.

- The pharmaceutical companies are entering this industry, bringing to the table science that will have an important impact on the industry and because of Saskatchewan's scientific and research community of which we can take advantage.
- The enforcement of Good Manufacturing Practices on the industry will force the small operator to upgrade their facilities, fitting with human consumption.

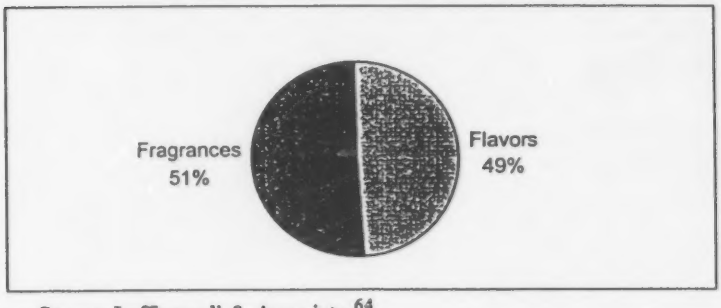
4 Essential Oils

Essential oils are derived from volatile aromatic compounds found in plants. The primary markets for essential oils are the flavour and fragrance industries, which includes soft drink companies, food companies, and perfume companies. Niche markets also exist for essential oils by producing products for aromatherapy.

4.1 Flavor and Fragrance Industry

The production and use of flavors and fragrances on an industrial scale started in the nineteenth century with the isolation of single chemicals responsible for the characteristic aroma of natural products (for example, cinnemaldehyde isolated from cinnamon oil and benzaldehyde from almond oil). The synthesis of aroma chemicals that reproduced the characteristic taste and odor of natural products has given rise to a new branch of chemical specialties. In 1998, the estimated total world Flavour and Fragrance Sales was $11 billion (US), with sales growth of 3- 4%.[63]

Figure 4 - 1999 World Flavour and Fragrance Market



Source: Leffingwell & Associates[64]

4.1.1 Consumer Demand

The flavor and fragrance industry has grown due to the following trends:[65]

- Increased demand for ethnic foods.
- Innovation in beverage products (such as flavored coffee, ready-to-drink teas and nutritional beverages).

[63] http://www.leffingwell.com/top_10.htm.
[64] Ibid
[65] http://www.dpif.tas.gov.au/domino/dpif/IndustryProfiles.nsf/65cc7bcd0c35212e4a2564b20027ef3c/9eec9e2f3020a78d4a2564c60015a0b3/SFILE/ATTDIZPW/Industry+Profiles+1999.pdf

- Growth in processed food consumption.
- Development of prestige product lines by the processed foods industry.
- Desire to make functional foods more palatable.
- Increasing demand for natural fragrances over synthetic aroma chemicals driven by public concerns over health and allergic reactions (in the US and Canada, the small male perfumes sector is growing the fastest).

4.1.2 Aromatherapy Markets

Aromatherapy refers to the use of essential oils to release odor molecules that can trigger impulses in the brain. Use of the scents for therapeutic purposes can spur therapeutic reactions. Essential oils are also used to trigger emotions and memory, promote relaxation and enhance energy. Europe has embraced the practice to a much larger extent than North America. In France, there are over six thousand MD's that work with essential oils for treating a variety of health concerns. Trained health professionals use essential oils in the form of boluses (a large pill), pessaries (a vaginal suppository), suppositories and orally for medical treatment. In Canada and the US it has only been recently embraced by consumers and practitioners.

4.1.2.1 Consumer Demand

Demand of aromatherapy products has grown due to the following reasons:

- Therapeutic benefits: Essential oils have effect via the olfactory nerves of the nose, as well as penetrate the dermas of the skin. They also impact the hypothalamus and pituitary gland via the nose, and influence the endocrine and hormonal systems. As well, stimulation and support of the immune system, and various excretory organs such as the lungs, kidneys, and skin also benefit from the use of essential oils.
- Avoidance of adverse side effects: Because essential oils have anti-inflammatory, anti-bacterial, viral and fungal activity, there is growing interest by the general public disenchanted with the over-use of antibiotics and cortisone. Part of the appeal of essential oils is that there is no evidence they cause side effects associated with prescription drugs.

4.2 Global Essential Oils Market

Essential oils can be distilled from the flower, bark, seed, leaves or roots of plants, or from the whole plant. They are used in the food and beverage industry as flavoring, in the cosmetic industry for fragrances and in the natural products industry for its functional properties and aromatherapy.

The 20 major oils in the world market are presented in the following table:

Table 16 – 20 major oils in the world market [66]

Essential oils	
Orange	Commint
Eucalyptus cineole-type	Citronella
Peppermint	Lemon
Eucalyptus citronellal-type	Clove leaf
Cedarwood (US)	Litsea cubeba
Sassafras (Brazil)	Lime distilled (Brazil)
Native spearmint	Cedarwood (Chinese)
Lavandin	Sassafras (Chinese)
Camphor	Coriander
Grapefruit	Patchouli

A wide variety of essential oils are traded on the world market. China and Asia account for the largest volume of essential oils. However, world production is fairly limited. Total production for some oils is as small as 550kg/yr. For the more widely used essential oils, global production ranges from 100,000 to 300,000 tons/year. The USA, Western Europe and Japan are the main consumers of these products and account for approximately 78% of total world consumption. [67]

Currently, the worldwide market for essential oils has been estimated at US$2.6 billion, with an annual growth rate of 7.5%.[68] This projection rate is based on the growth rates of its primary end users, particularly the flavor and fragrance market in which the essential oils are the core of the $11 billion flavor and fragrance industry. Despite their being a very small volume commodity, the oils and their chemical derivatives have strategic importance because of the irreplaceability in certain formulas that have been well established and on the retail market for years.

4.3 Flavor and Fragrance Global Market

The United States is the largest producer and user of F&F products. However, France has historically been, and remains to be, the largest producer and exporter of those fragrance materials that supply the upscale fragrance and skin care products market segment. The United States and Western Europe together account for 64.8% of F&F product consumption. If Japan is included, the three major industrial regions, with only 13.3% of the world's population, account for approximately 77% of consumption. The United States and Western Europe exhibit similar patterns of consumption, divided approximately equally between flavor and fragrance compositions, while consumption of flavors in Japan is over four times greater than that of fragrances.

[66] http://www.hort.purdue.edu/newcrop/proceedings1993/V2-620.html #Table 1

[67] http://www.rirdc.gov.au/comp00/eop1.html #BRA-3A

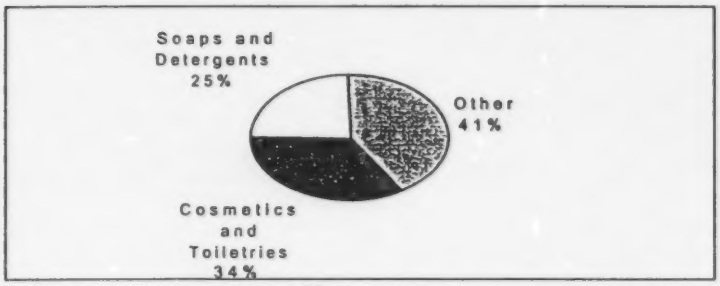
[68] http://www.uwichill.edu.bb/bnccde/sk&n/conference/papers/DRMcGaw.html

Table 17 - Global Fragrances & Flavours Market Size (measured by retail sales) (1999)

	Fragrances		Flavors	
	$ (billions)	%	$ (billions)	%
North America	1.865	34	1.609	32
Asia-Pacific	N/A	23	1.347	26
Western Europe	1.526	29	N/A	25
South America	N/A	6	N/A	6
Middle East and Africa	N/A	6	1.838	6
Eastern Europe	N/A	2	N/A	5
		100		100

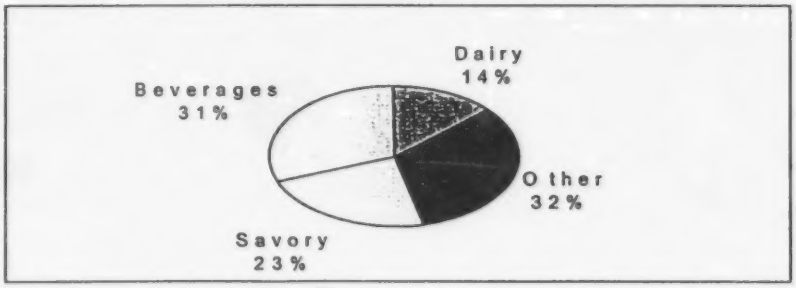
Source: Chemical Weekly [69]

Figure 5 - 1999 World Fragrance Market



Source: Leffingwell & Associates[70]

Figure 6 – 1999 Worldwide Flavor Market



Source: Leffingwell & Associates[71]

[69] http://www.chemicalweekly.com/current/Aug_08/fnew09.htm
[70] Ibid
[71] Ibid

Table 18 - Growth projections for the global F&F market over the next five years

	Fragrances	Flavors
North America	1.8%	2.7%
Asia-Pacific	N/A	4.5%
Middle East and Africa	N/A	4.1%
Eastern Europe	5.8%	N/A

Source: Chemical Weekly [72]

The global *flavors* market is projected to grow by 3.2% per annum by 2004, while the *fragrances* market is projected to grow at 2.5% per annum. The average annual growth rate for F&F over the next five years is forecast to be 2.8%. The growth in the *flavors* market is expected to be in the **savory and convenience food sectors**. In the fragrances market, the fastest growth would be in the **'others' sector, which includes candles and aromatherapy applications**.[73]

In North America, the trend in the flavors market is for flavors to make functional products palatable. The trend in the fragrances market is the increasing demand for natural fragrances over synthetic aroma chemicals driven by public concerns over health and allergic reactions.

4.3.1 *Aromatherapy Market*

As indicated above, in the fragrances market the fastest growth would be in the "others" sector, which includes candles and aromatherapy applications.[74] According to the National Association for Holistic Aromatherapy, total aromatherapy sales in the US topped $300 million in 1998 and are projected to reach a billion in the year 2000. Leading manufacturers of aromatherapy products estimate the market is growing at 20% to 30% a year. Within the natural products industry, aromatherapy is estimated to be between $20 million and $25 million wholesale in the US.

4.3.2 *Key Players*

4.3.2.1 Flavour and Fragrances

The purchasing of processed essential oils is limited to a few large multinational companies. There are approximately 300 firms in the flavoring and fragrance industry worldwide. The top 5 international companies control 50% of the world sales. They are:

- International Flavors and Fragrances

[72] http://www.chemicalweekly.com/current/Aug_08/fnew09.htm
[73] http://www.chemicalweekly.com/current/Aug_08/fnew09.htm
[74] Ibid.

Hazlet, New Jersey
(908) 329-5531
www.iff.com

- Givaudan
  East Stroudsburg, Pennsylvania
  (570) 476-6300
  http://ingredients.givaudan.com

- Firmenich
  Princeton, New Jersey
  (609) 452-1000
  www.firmenich.com

- Quest International
  Bussum, The Netherlands
  www.questintl.com

- Takasgo Inc.
  Kawasaki, Japan
  (044) 822-4111
  www.takasago-i.co.jp

See Section 18 of the report for further information on these companies.

Table 19 - Industry Leaders[75] ('000,000)

Rank	Company	1998 US $	Est. 1998 Market Share	1999 US $	Est.1999 Market Share	2000 US $	Est.2000 Market Share
1	Givaudan	$1,530.30	13.70%	$1,401.40	12.70%	$1,462.80	13.30%
2	IFF	$1,407.30	12.80%	$1,439.50	13.10%	$1,396.90	12.70%
3	Quest International	$1,071.90	9.70%	$1,091.60	9.90%	$1,026.00	9.30%
4	Firmenich	$1,017.70	9.30%	$1,067.90	9.70%	.	.
5	Takasago	$881.60	8.00%	$946.10	8.60%	.	.
6	H&R	$961.10	8.70%	$779.10	7.10%	$814.80	7.40%
7	Bush Boake Allen	$485.40	4.40%	$499.00	4.50%	$471.60	4.30%
8	Sensient Flavors	$347.00	3.20%	$374.00	3.40%	$378.00	3.40%
9	T. Hasegawa	$348.70	3.20%	$409.60	3.70%	$366.90	3.30%
10	Dragoco	$339.00	3.10%	$319.00	2.90%	.	.
		$8,390.00		$8,327.20			

Please note that IFF recently acquired Bush Boake Allen

Lazlo Unger, an economist at Givaudan, estimated the world F&F market at US $4.0 billion in 1979, and $4.2 billion in 1981 and 7.0 billion in 1987.[76] Hans Hartmann of H&R estimated the world F&F market at US $7.8 billion in 1990 and $9.6 billion in 1995 and the flavor market (only) at 4.5 billion in 1994.[77] Ron Fenn of IFF estimated the total F&F market in 1995 at about US $10 billion and projected a market of $12 billion in the year 2000.[78]

As a result, the total market has been expanding at an average annual rate of sales increase of 5.7% for the last 20 years.

During this period, IFF's actual average annual rate of $ sales increase was 6.7%, Firmenich - 11.1%, Bush Boake Allen - 7.8%, Dragoco - 6.3%, and Takasago 11.5%. From 1986, T. Hasegawa's actual average annual rate of $ sales increase has been 7.4%.

In **North America**, the top four international firms specializing in flavoring and fragrances represent 25% of total industry purchases. 41% of the market is shared by several hundred small and medium sized national and international companies.

Within the aromatherapy market, Frontier Natural Products Coop, which owns Aura Cacia, is the largest manufacturer of aromatherapy products with a 34% market share according to SPINs data. Other category leaders include:

- Tisserand
  Hove, Sussex, UK
  44 (0)1273 325666

[75] http://www.leffingwell.com/top_10.htm
[76] Perfumer & Flavorist, Vol. 7, August/September, 1982, p. 52, and Vol. 14, May/June, 1989, p. 43.
[77] Perfumer & Flavorist, Vol. 21, March/April, 1996, p. 22, and Vol. 20, September/October, 1995, p. 35.
[78] Perfumer & Flavorist, Vol. 23, March/April, 1996, p. 11.

www.tisserand.com

- Desert Essence (branch of Country Life)
  Hauppauge, New York
  (631) 231-1031
  www.desertessence.com

- Oshadhi USA
  Petaluma, California
  (888) 674-2344
  www.oshadhiusa.com

- Aroma Vera
  Almere, Netherlands
  (036) 534-7851
  www.aromavera.nl

- Amrita Aromatherapy
  Fairfield, IA
  (641) 472-9136
  www.amrita.net

4.4 Processing Essential Oils

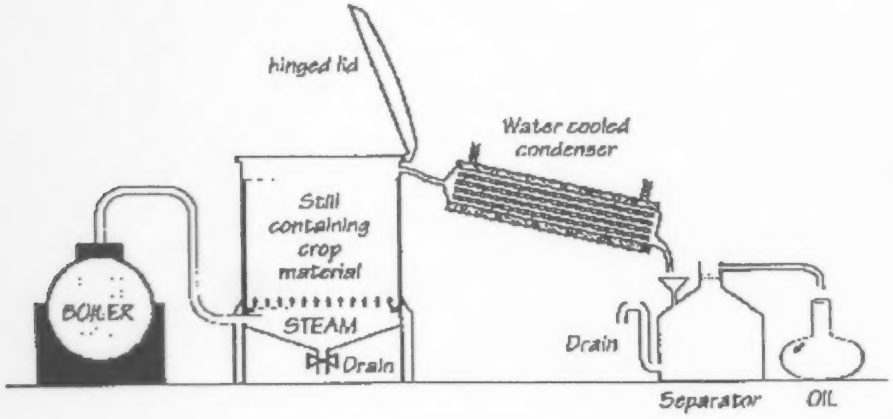
Plants yield between 0.01% and 2.0% essential oil (calculated on the weight of fresh herb distilled). A large area of crop is required (more than 20 ha) to obtain reasonable quantities of oil. Essential oil production is dependent on both intrinsic factors (genotype, state of maturity, part of plant harvested) and extrinsic factors (light, temperature, water, nutrients). These factors will strongly influence the oil yield and composition. Basically, the more stress the plant is under, the higher its oil content. In Saskatchewan, the long hot days and cool nights, put stress on the plants creating a favorable climate for oil production.

- Essential oils may be derived from plants with the following processes:
  - Hydro distillation, also known as water distillation, is a process in which water and plant material is boiled together in a common tub.
  - Steam distillation uses dry steam to vaporize and extract the oil. Steam distillation is used by commercial ventures seeking to process large quantities of essential oils economically. Typical equipment required is a steam generator, pressure cooker, pilot scale, commercial scale, condenser, separator, storage vessels.
  - Solvent extraction uses organic solvents to extract both essential oils and oleoresins, which are then separated.

- Supercritical extraction is another form of solvent extraction in which carbon dioxide is used under extremely high pressure to extract both essential oils and oleoresins.

Essential oils are commonly extracted by steam distillation. The basic still design is shown in the following figure. Steam is piped from a boiler into the bottom of the still vessel which contains the plant material. The volatile oils in the plant material are released and carried upwards with the steam and pass from the top of the still vessel through a condenser. Cold water flows continuously through a system of internal tubing in the condenser, cooling the steam/oil mix to a liquid. The water and oil flow into a separator (florentine flask) where the oil, generally having a specific gravity less than water, floats to the surface and is collected.

Figure 7 - Basic still design for steam distillation

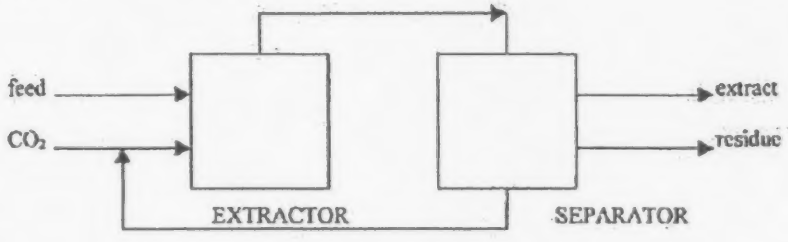


However, because of the high temperature associated with the steam, there is some inherent thermal degradation of the volatile oils. Within the last twenty years a new technique has been developed and commercialized to prevent the loss of these volatile material, as well as offer greater flexibility in selectivity of exactly which components can be extracted from a particular matrix. The process is called Supercritical Fluid Extraction (SFE).

Supercritical Fluid Extraction (SFE), with respect to the extraction of essential oils, involves the use of carbon dioxide as the solvent. Carbon dioxide is cheap, inflammable, and leaves no detectable residue. A typical SFE process consists of two major segments, the extractor and the separator. The material to be extracted is packed into the extractor and supercritical carbon dioxide enters the extractor where it dissolves the volatile material in the plant. The CO_2 and the extract then go to the separator where the pressure is below critical thereby allowing the CO_2 to revert to the gas phase and deposit the

extract. The CO_2 can then be recycled to the extractor vessel. In order for the CO_2 to be in the supercritical state, the pressure and temperature must be above the critical point of CO_2.

Figure 8 - Supercritical Fluid Extraction



Steam Distillation is the industry norm. However, Young Living Essential Oils in Utah reports to have a distillation facility that requires a minimum of 1,000 acres of production.

4.5 United States

The United States is the largest user of essential oils, importing an estimated $242 million of essential oils in 1995.[79] According to the National Association for Holistic Aromatherapy, the aromatherapy market (a niche market for essential oils) had estimated sales in the US of $300 million in 1998 and was projected to reach one billion dollars in the year 2000. Leading manufacturers of aromatherapy markets estimate the market to be growing at 20% to 30% a year.[80] The market for essential oils in North America is predominantly located in the United States along the East Coast[81]

[79] Alberta Government
[80] NBJ April 1999
[81] http://www.agric.gov.ab.ca/economic/market/herbsarticle.html

4.5.1 Trade

Table 20 - US Exports of Essential Oils (in Canadian Dollars)

	1996	1997	1998	1999	2000	% of 2000 total	Cumulative %
Canada	206,539,918	224,972,430	237,574,817	271,462,327	303,333,891	24%	24%
Japan	252,230,066	138,085,655	9,0922,742	84,139,023	117,695,330	9%	33%
Mexico	56,411,452	72,765,198	9,0741,928	107,786,891	109,610,041	9%	42%
United Kingdom (U.K.)	71,015,186	70,198,942	7,9282,477	76,391,663	75,364,396	6%	47%
France	35,756,295	52,133,908	4,4997,681	50,365,059	67,267,788	5%	53%
Belgium	34,389,872	42,097,169	3,0288,668	31,385,185	59,299,236	5%	57%
Netherlands	37,254,378	35,447,453	5,4802,095	54,452,561	55,245,613	4%	62%
Germany	31,578,245	44,221,553	4,0320,457	36,117,063	43,257,447	3%	65%
Philippines	26,968,746	28,390,912	2,5680,713	23,273,790	32,826,559	3%	68%
Hong Kong	35,423,522	37,751,324	3,9023,351	24,685,453	26,628,983	2%	70%
Ireland	21,309,954	20,599,299	2,2370,805	21,284,269	26,301,791	2%	72%
Brazil	18,372,455	19,543,701	2,4355,803	21,477,462	25,978,915	2%	74%
Spain	21,174,011	19,145,020	1,9461,189	18,943,437	24,707,074	2%	76%
Australia	15,670,928	14,471,276	2,3439,691	22,192,142	23,695,661	2%	78%
China (excluding Mongolia)	3,682,504	4,260,210	7191,194	18,249,278	20,801,386	2%	79%

Source: Strategis[82]

[82] http://strategis.ic.gc.ca/sc_mrkti/tdst/engdoc/tr_homep.html; includes HS Codes of essential oils (330111 to 330119 and 330121 to 330129) as well as mixtures for the food, drink and perfume industries (HS Codes of 330210 and 330290)

Table 21 - US Imports of Essential Oils (in Canadian Dollars)

	1996	1997	1998	1999	2000	% of total	2000 Cumulative %
France	82,543,842	85,655,746	96,338,746	95,134,336	95,333,503	16%	
Switzerland	59,337,639	50,012,872	60,931,345	46,005,084	53,013,575	9%	25%
Argentina	25,882,921	31,920,635	28,852,970	23,762,266	50,383,579	9%	34%
Brazil	55,194,803	48,954,703	45,883,387	37,948,335	45,190,834	8%	42%
China	29,687,825	24,840,552	37,773,267	37,828,284	39,656,462	7%	48%
Mexico	30,566,242	22,010,074	31,523,495	28,392,937	35,324,826	6%	55%
Canada	24,234,139	25,232,458	28,484,177	27,987,667	31,970,126	5%	60%
United Kingdom (U.K.)	17,942,756	22,858,007	30,674,505	29,681,546	28,288,350	5%	65%
Germany	19,974,452	18,706,507	22,664,945	27,107,507	25,757,197	4%	69%
Indonesia	15,000,240	32,331,037	52,879,207	30,024,474	25,096,581	4%	74%
India	18,313,936	18,021,846	20,148,743	18,701,671	21,084,762	4%	77%
Spain	9,056,779	15,957,044	23,102,100	19,506,532	19,019,532	3%	80%
Italy	11,537,531	11,089,684	10,864,854	14,989,804	13,982,677	2%	83%
Japan	11,872,238	18,066,848	15,655,435	13,431,194	13,855,452	2%	85%
Netherlands	9,343,164	12,491,948	16,339,290	12,299,227	12,986,212	2%	87%
Ireland	80,402,976	72,899,795	51,900,303	64,955,952	11,036,379	2%	89%

Source: Strategis[83]

[83] http://strategis.ic.gc.ca/sc_mrkti/tdst/engdoc/tr_homep.html; includes HS Codes of essential oils (330111 to 330119 and 330121 to 330129) as well as mixtures for the food, drink and perfume industries (HS Codes of 330210 and 330290)

4.6 Canada

4.6.1 Trade

Table 22 — Canadian Exports of Essential Oils (Values in Canadian Dollars)

	1996	1997	1998	1999	2000	% of 2000 total	Cumulative %
United States (U.S.)	25,432,402	26,366,036	31,441,620	30,704,360	34,115,814	91%	
France (includes Monaco and Andorra)	167,873	285,300	275,565	586,445	653,166	2%	93%
Japan	582,690	257,936	519,114	422,413	471,270	1%	94%
United Kingdom (U.K.)	399,747	446,486	370,111	277,874	456,981	1%	95%
Netherlands	451,864	468,407	391,232	401,531	383,345	1%	96%
Georgia	0	0	0	0	273,833	1%	97%
Germany	361,461	257,430	174,531	72,520	220,434	1%	97%
Italy (includes Vatican City State)	33,318	0	0	182,975	148,205	0%	98%
Australia	59,243	8,950	11,797	17,633	140,825	0%	98%
Ireland	59,284	80,917	160,702	0	140,809	0%	99%
Spain	46,418	33,441	0	113,936	83,035	0%	99%
Hungary	0	0	0	0	70,765	0%	99%
Switzerland	38,700	138,716	80,000	0	68,386	0%	99%
Trinidad and Tobago	6,671	0	0	11,860	66,403	0%	99%

Source: Strategis[84]

[84] http://strategis.ic.gc.ca/sc_mrkti/tdst/engdoc/tr_homep.html; includes HS Codes of essential oils (330111 to 330119 and 330121 to 330129) as well as mixtures for the food, drink and perfume industries (HS Codes of 330210 and 330290)

Table 23 - – Canadian Imports of Essential Oils (Values in Canadian Dollars)

	1996	1997	1998	1999	2000	% of 2000 total	Cumulative %
United States (U.S.)	196,020,407	216,989,951	230,522,202	261,129,199	294,002,004	92%	
United Kingdom (U.K.)	2,557,850	5,256,889	5,325,886	4,761,675	5,526,109	2%	94%
France (includes Monaco and Andorra)	3,709,501	3,321,434	3,204,480	3,601,477	3,737,866	1%	95%
Brazil	697,980	1,263,303	1,615,010	1,730,467	1,791,083	1%	96%
Argentina	1,090,268	946,815	584,929	1,050,385	1,707,603	1%	96%
Switzerland	2,001,428	2,162,168	2,371,225	2,065,804	1,490,135	0%	97%
Germany	1,068,170	982,967	1,026,949	1,837,683	1,176,846	0%	97%
Australia	435,187	639,833	749,260	926,167	1,129,577	0%	97%
Italy (includes Vatican City State)	1,131,156	1,103,126	1,814,278	986,996	935,768	0%	98%
Indonesia (includes East Timor)	303,191	416,424	652,008	1,159,638	800,689	0%	98%
China (including Mongolia)	1,694,861	603,172	707,167	918,603	736,697	0%	98%
Spain	586,305	1,125,828	990,259	1,093,544	691,824	0%	98%
India	312,784	786,575	816,631	927,180	674,691	0%	99%
Belize	0	10,655	0	64,622	495,404	0%	99%
Mexico	274,423	282,760	204,049	604,905	382,681	0%	99%
Japan	146,233	192,214	187,264	257,860	355,946	0%	99%

Source: Strategis[85]

[85] http://strategis.ic.gc.ca/sc_mrkti/tdst/engdoc/tr_homep.html; includes HS Codes of essential oils (330111 to 330119 and 330121 to 330129) as well as mixtures for the food, drink and perfume industries (HS Codes of 330210 and 330290)

Table 24-Canadian Exports of Essential Oils by Province (Values in Canadian Dollars)

	1996	1997	1998	1999	2000	% of 2000 total	Cumulative %
Quebec	5,049,742	8,792,796	9,907,354	13,422,930	15,798,814	42%	
Ontario	17,790,818	14,463,609	16,468,710	12,524,467	15,794,348	42%	84%
Alberta	3,608,028	3,897,942	5,276,201	5,228,072	4,572,176	12%	96%
Saskatchewan	383,381	347,568	1,010,814	948,167	929,470	2%	99%
BC	1,202,440	1,403,803	1,505,475	504,143	406,973	1%	100%
Nova Scotia	0	11,155	0	3,546	11,724	0%	100%
Manitoba	0	0	0	369,333	3,430	0%	100%
TOTAL	28,034,409	28,916,873	34,168,554	33,000,658	37,516,935	100%	

Source: Strategis[86]

4.7 Distribution Channels for Essential Oils

Essential Oils are sometimes distilled by the grower on the farm or sometimes by a processor. The product is then sent to extract processors, essential oil suppliers, or flavor/fragrance houses for additional processing.

However, the structure of the F&F industry is somewhat complicated. It is not a single homogeneous industry, but a composite of closely interrelated and somewhat overlapping business sectors with differentiated operating characteristics.

Most major participants in the F&F compositions business operate internationally and maintain a presence in virtually all markets around the globe. As many as 500 companies participate in the F&F industry worldwide. Fewer than half are engaged in merchant sales of F&F compositions, and only about fifteen major global F&F houses manufacture and market the whole range of F&F products

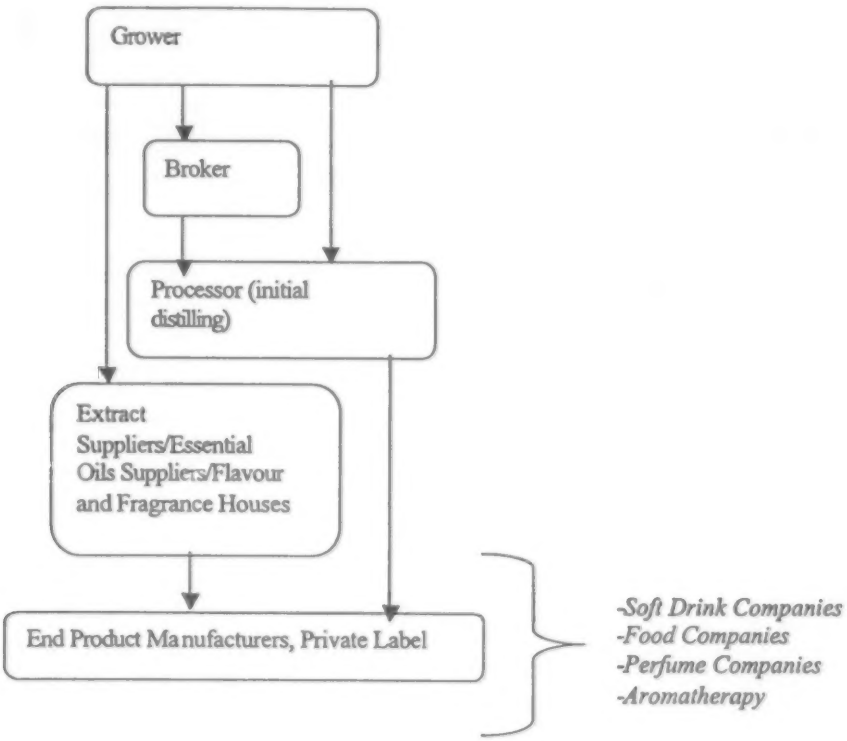
A few large end-users such as Proctor and Gamble, Colgate-Palmolive and Lever Brothers, are integrating backwards by buying oil components directly and creating their own compounds rather than having the flavor and fragrance houses develop the mixtures.

Other end users of the oil mixtures include the natural product industries, aromatherapists and cottage craft outlets. Aromatherapy products are being sold in all types of outlets with health food and beauty stores accounting for 60% to 70% of products sold, practitioners approximately 5%, and the bulk of the remainder sold through mainstream outlets. [87]

[86] http://strategis.ic.gc.ca/sc_mrkti/tdst/engdoc/tr_homep.html; includes HS Codes of essential oils (330111 to 330119 and 330121 to 330129) as well as mixtures for the food, drink and perfume industries (HS Codes of 330210 and 330290)

[87] NBJ, "Aromatherapy Sales Nose Upwards," April 1999, p. 9.

Figure 9- Essential Oils Distribution Channel



4.8 Consolidation

The F&F industry has experienced a great deal of restructuring during the past decade as a result of acquisitions, mergers, diversification, and joint ventures. The common objective of these activities has been to improve companies' competitive positions for sustained and continuing growth. During the past decade the ten leading F&F companies have absorbed at least forty other companies, and four of the ten are, in turn, owned by larger corporations (Givaudan Roure, Quest, H&R and Universal Flavor).

In general, the most successful diversification by F&F houses has been to leverage their core competence in F&F raw materials and compounding in conjunction with advanced technologies for processing them (e.g. supercritical gas extraction).

4.9 Buying Criteria

4.9.1 Flavor and Fragrance Industry

A new trend in the flavor and fragrance industry is to keep their inventories to a minimum and rely on the processors to deliver the raw materials on time as needed.
The flavour and fragrance industry doesn't care whether oils are re-distilled, rectified, enhanced, blended, or extended. All that matters is that the same fragrance be available year after year.

4.9.2 Aromatherapy

Those in the aromatherapy world prefer oils that have the highest level of safety, with no adulteration, and ideally no pesticide or herbicide residual.

5 Spices and Dried Culinary Herbs

Spices are defined by the American Spice Trade Association as "any dried plant product used primarily for seasoning purposes". As such, the difference between a culinary herb and spice is limited. Included in this definition is tropical aromatics (pepper, cinnamon, cloves etc.); leafy herbs of the temperate zone (oregano, basil, sage, etc.); spice seeds (sesame, mustard, caraway etc.) and dehydrated vegetables used as spices (onion, garlic, chili peppers etc). All in all, the data reported here is largely comparable and for purposes of this report, data will be broken out between spices and dried herbs if provided. However, under this broad definition, the general trend is one in which both domestic and international consumption of spices and dried culinary herbs have steadily increased around the world during the past few decades.

5.1 Consumer Demand

The spice market has been increasing at a rate of 3 to 4% annually. This growth in the global market for spices is due to the following reasons:

- A process of ethnic diversification is driving change in consumer tastes. Immigration, with the arrival of people from Asia and the Middle East in the last decade in particular, has been an obvious influence. As migrants establish new communities, they create a demand for new seasonings. Predictions are that Indian spice blends, use of curry and other Eastern flavors will be big. Also, Asian influences, such as food from Vietnam, Thailand and Korea will gain popularity, as will jerk spices from the Caribbean. Feijoada -- a traditional Brazilian meal of smoked pork, sausage, rice, black beans and orange slices will be hot too, as well as cuisine from Argentina and other countries below the Tropic of Capricorn.
- Growth in the food service industry: chefs have been and continue to be very innovative in the food service trade.
- Using herbs and spices is an excellent way to moderate dietary levels of fat, sugar and sodium and the calories in herbs and spices are far less than in breading, batters, gravies, sauces and fried foods.
- The health benefits derived from spices and herbs is being researched and the results are beginning to become known. For example:

  > *Tom Yum Gung - a traditional Thai shrimp soup with herbal ingredients like coriander, lemon grass, lime leaves and even galangal roots has been shown in a recent joint study by Thailand's Kasetsart University and Japan's Kyoto and Kinki Universities to have ingredients that are 100 times more effective in inhibiting cancerous tumor growth than other foods.*

- North Americans want to continue to enjoy the foods they ate on overseas holidays.
- Cost savings by the possibility of dressing up inexpensive foods for a special meal.
- Bolder and bigger is better, while bland is out. The flavour profile in 2005 will be spicier, more intense and encompass a more complex spectrum of flavors. An aging

customer base will drive much of this shift to bolder flavors, as consumer's sensory taste perceptions diminish with age.

- With the growth of the convenience food market the use of herbs for flavorings has increased.

5.2 Global Spice and Dried Culinary Herb Market

5.2.1 Spices

In terms of value and volume, the global spice trade is estimated at US $1.5 to 2 billion and 400 to 450 thousands metric tons in quantity.[88] The market world-over is growing and significant growth has been noticed in specific spice segments like hot spices in the U.S., and aromatic culinary herbs in France. Major growth of spices is accounted for by the industrial and food service sectors.

5.2.2 Dried Culinary Herbs

Growers are widely dispersed throughout the world but the major production areas for most herbs are centered in European and Asian countries. Herb production is increasing in Canada and the US, particularly in California. North American growers have generally specialized in herbs such as ginseng, dill and mint.

5.3 United States

A continuing trend is the steady increase in consumer spice use, which has risen 71% since the late 1970's. New products are constantly being introduced to satisfy consumer demands. The US markets over 10,000 new spice products a year. Many of these are in the form of specialty foods or spice blends. Spices are an integral part of foods in North America. It is estimated that 60% of the total US Spice consumption is through industrial and foodservice channels. This is an established market, which is only increasing with the increased purchases of prepared foods for working couples and singles with higher disposable incomes.

The USA is the largest consumer of culinary spice. They produce approximately 190,000,000 pounds, with California being the state with the largest spice production. Dehydrated vegetable products account for a lot of the pounds produced. However, there remains a large import market for spice in the US.

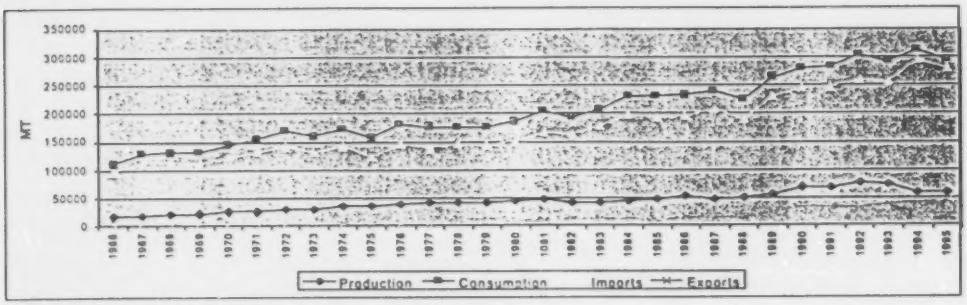
[88] http://www.pippernigrum.bigstep.com/generic.html?pid=3

The United States is the world's largest importer of spices as well as a growing producer. Both imports and domestic production of spices of have been rising, reflecting growth in spice demand.

Domestic production totaled 369 million pounds in 1998, about 1% lower than 1997 but 45.8 million pounds higher than in 1979.

Consumption is steadily increasing. Spice consumption in the US totaled 968.8 million pounds in 1998 (or 3.6 pounds per capita), 4% higher than the year before. Hot Spices are the most important segment of the market, representing 39% of total US consumption.

Figure 10 - US Spice Imports, Consumption, Production and Exports



Source: USDA (spice imports.wk1)

Table 25 -US Production and Imports of the Top 12 Spices

Spice	Thousand Pounds	Major Suppliers
Dehydrated Onion	262,502	US, China
Mustard Seed	222,341	Canada, US
Sesame Seed	104,551	Guatemala, Mexico, India
Red Pepper	104,551	US, Mexico, China, India
Black Pepper	83,556	India, Indonesia, Brazil
Paprika	57,798	US, Spain, Chile, Israel
Cinnamon	42,884	Indonesia, Sri Lanka, China
Cumin Seed	15,751	India, Turkey, Syria
Oregano	14,349	Turkey, Mexico, Greece
Poppy Seed	12,926	Australia, Netherlands, Turkey
White Pepper	11,885	Indonesia, Malaysia, China
Fennel Seed	8,270	Egypt, India, Turkey
Total	941,364	

Source: Food Institute Report, January 24, 2000

Table 26 - Major Spice Supplying Nations

Country	Thousand Pounds	% of U.S. Consumption
US	369,007	38%
Canada	149,753	15%
India	88,615	9%
Indonesia	84,289	9%
China	67,075	7%
Mexico	45,399	5%
Guatemala	32,550	3%
Total	836,688	86%

Source: Food Institute Report, January 24, 2000

The top seven spice supplying nations account for 86% of total US production.

The US imports over 40 species of spices, with 7 of them (vanilla beans, black and white pepper, capsicums, sesame seed, cinnamon, mustard and oregano) accounting for over 75% of total annual spice imports. Five countries account for over 50% of American imports, one of which is Canada.

US exports of spice during 1999 were valued at $110.4 million, an increase of 2%. Canada remains the USA's largest market for exports accounting for 28% of the total, while Mexico is the second largest exporter.

Table 27 - US Spice Exports (expressed in Canadian dollars)

	1996	1997	1998	1999	2000	% 2000 total	of Cumulative %
Canada	27,288,590	28,238,174	32,660,500	28,769,214	27,317,552	26%	
Mexico	4,206,646	5,926,841	11,535,802	11,932,011	14,966,389	14%	40%
Japan	5,750,120	4,813,379	4,188,706	4,069,695	9,181,561	9%	49%
United Kingdom (U.K.)	2,392,657	3,452,437	3,255,470	4,423,894	5,710,068	5%	54%
Belgium	2,475,196	4,033,652	5,400,540	6,444,946	5,678,873	5%	59%
Germany	2,433,887	3,538,493	6,635,518	2,443,310	5,594,393	5%	65%
Netherlands	1,077,489	1,565,971	3,066,409	4,515,955	3,196,684	3%	68%
Korea, South	1,819,438	1,193,183	778,644	1,517,771	3,171,870	3%	71%
Saudi Arabia	464,119	411,329	712,032	1,236,224	3,071,980	3%	74%
Hong Kong	955,664	933,156	2,172,681	1,708,521	2,655,836	2%	76%
Australia	2,241,827	2,527,719	2,458,523	2,169,130	1,718,642	2%	78%
Venezuela	954,006	1,302,248	1,393,223	2,023,926	1,717,499	2%	79%
Taïwan (Taïpei)	536,476	486,463	350,918	373,719	1,510,224	1%	81%

Source: Strategis[89]

Table 28 - US Imports of Spices (expressed as Canadian dollars)

	1996	1997	1998	1999	2000	% 2000 total	of Cumulative %
Indonesia	140,133,441	153,866,472	188,700,189	148,917,427	196,212,448	25%	
India	91,256,514	141,680,417	153,657,363	214,724,749	136,006,909	18%	43%
Brazil	21,287,089	28,709,716	49,283,348	55,217,580	60,465,326	8%	51%
Madagascar	29,660,591	37,796,029	35,264,662	28,177,011	45,437,235	6%	57%
Mexico	24,627,370	28,152,224	39,519,314	45,401,127	44,414,741	6%	62%
China (excluding Mongolia)	13,948,649	19,447,862	25,593,114	30,955,454	38,678,732	5%	67%
Malaysia	5,827,136	15,743,797	7,035,574	22,569,990	35,089,057	5%	72%
Vietnam	1,426,630	4,000,018	6,266,977	24,591,201	27,670,137	4%	76%
Spain	24,692,402	22,016,163	29,029,603	23,260,376	26,071,190	3%	79%
Turkey	24,109,775	22,697,410	26,242,949	26,427,736	25,588,592	3%	82%
Chile	15,331,840	15,748,287	18,269,416	16,084,730	19,715,678	3%	85%
Syria	4,115,583	2,931,875	3,955,027	6,151,802	11,068,431	1%	86%
Sri Lanka	5,796,466	6,683,490	12,867,100	10,394,684	11,040,751	1%	88%
Israël	3,888,825	4,101,527	7,047,776	6,644,557	9,849,010	1%	89%
Canada	5,726,688	6,640,373	6,371,582	7,435,699	7,059,484	1%	90%

Source: Strategis[90]

[89] http://strategis.ic.gc.ca/sc_mrkti/tdst/engdoc/tr_homep.html; HS Codes include 090400 to 091099

5.3.1 *Emerging/Popular Spices in the US*

Growth in the consumption of ethnic foods is stimulating the rise of more and a greater variety of spices. The fact that the US population is becoming both more Asian and Hispanic, coupled with the rise in popularity of Asian and Hispanic foods, has increased demand of typical spices of these countries including:

Ginger	Onion
Garlic	Red Pepper
Coriander (seeds and leaves)	Black & White Pepper
Anise	Cumin
Fennel	Cloves
Nutmeg	Curry Powder
Cinnamon	Star Anise
Mace	Tumeric

5.4 Canada

Canada is a net importer of spices. In 1998, Canada imported $84 MT of spices and exported $9 MT. From 1996 to 1998 Canadian spice imports increased at an average annual compound rate of 15% (AAFC, "Agri-Food Trade",1998).

Of the imports in 1998, 41% of the total could be accounted for as pepper, followed by capsicum and pimento products with a 15% share.

Table 29 - Canadian Import Shares of Spices (1998)

Canadian Import Shares of Spices (1998)	
Pepper	41%
Capsicum/Pimento	15%
Vanilla Beans	5%
Cinnamon	4%
Ginger	10%
Thyme & Bay	1.7%
Curry	3.1%
Spice Mixtures	4.1%
Other Spice	9.5%

Source: AAFC, "Agri-Food Trade"

The supply of spices produced in Canada is extremely limited. In 1998, Canada was a net exporter of only coriander, caraway, and mustard seed.

[90] http://strategis.ic.gc.ca/sc_mrkti/tdst/engdoc/tr_homep.html; HS Codes include 090400 to 091099

Currently 92% of our exported spices go to the USA. Canadian producer's competition in the spice market comes from India, Indonesia and Mexico, who rank in the top five of suppliers to the American spice market.

Table 30 - Canadian Spice Exports (expressed in Canadian dollars)

	1996	1997	1998	1999	2000	% of 2000 total	Cumulative %
United States (U.S.)	13,163,477	14,023,547	17,760,157	22,789,786	24,691,355	87%	87%
Netherlands	702,465	111,662	325,495	295,332	1,130,665	4%	91%
Japan	896,740	963,102	567,615	318,943	413,600	1%	92%
Trinidad and Tobago	66,192	108,147	38,917	84,162	393,735	1%	93%
United Kingdom (U.K.)	133,579	258,359	253,148	209,925	386,399	1%	94%
Germany	0	14,062	0	103,548	205,383	1%	95%
Spain	0	0	291,732	267,791	161,487	1%	96%
Barbados	4,760	5,531	100,854	141,779	153,530	1%	97%
Sri Lanka	0	79,634	0	0	128,735	0%	98%
Hong Kong	114,770	165,812	23,968	58,333	103,344	0%	99%
Sweden	99,120	70,103	71,700	115,400	98,310	0%	100%
New Zealand	0	0	0	0	71,279	0%	100%

Source: Strategis[91]

[91] http://strategis.ic.gc.ca/sc_mrkti/tdst/engdoc/tr_homep.html; HS Codes include 090400 to 091099

Table 31 - Canadian Exports by Province of Spices (expressed in Canadian dollars)

	1996	1997	1998	1999	2000	% of 2000 total	Cumulative %
ONT	4,602,611	5,273,291	6,207,697	7,368,737	8,320,847	29%	
PQ	7,108,525	5,791,653	7,931,106	10,488,779	8,068,156	28%	58%
SK	1,466,134	3,778,882	4,222,905	5,584,885	5,562,892	20%	77%
BC	304,548	507,717	336,794	375,838	3,988,391	14%	91%
MB	2,622,065	2,344,192	1,490,248	1,687,059	2,037,591	7%	98%
AB	202,626	241,720	506,521	416,804	454,055	2%	100%
ND	-	-	-		-	0%	100%
NB	-		-	15,684 -	-	0%	100%
TOTAL	16,306,509	15,297 17,952,752	20,695,271	25,937,786	28,431,932	100%	

Source: Strategis[92]

Table 32 - Canadian Exports of Selected spices (expressed in Canadian dollars)

	1996	1997	1998	1999	2000	% of 2000 total	Cumulative %
Anise or Badian Seeds							
SK	48,989	24,157	60,186	471,902	129,465	100%	
PQ	-	15,005	-	11,128	-	0%	100%
ONT	2,441	-	28,568	-	-	0%	100%
MB	-	-	6,148	-	-	0%	100%
BC	-	-	2,599	-	-	0%	100%
	51,430	39,162	97,501	483,030	129,465	100%	
Coriander Seeds							
SK	817,444	2,558,795	2,624,324	2,602,210	2,134,604	58%	
MB	1,203,616	1,433,182	857,573	835,833	843,107	23%	81%
ONT	128,514	616,943	271,165	224,495	422,048	12%	93%
AB	-	-	76,116	73,131	242,572	7%	99%
PQ	-	90,299	68,129	22,811	16,505	0%	100%
BC	2,123	251,432	50,332	151,643	10,099	0%	100%
NF	-	-	-	15,684	-	0%	100%
	2,151,697	4,950,651	3,947,639	3,925,807	3,668,935	100%	
Cumin Seeds							
ONT	39,235	12,546	2,240	3,331	18,642	86%	
BC	5,413	3,444	2,545	-	3,128	14%	100%

[92] http://strategis.ic.gc.ca/sc_mrkti/tdst/engdoc/tr_homep.html; HS Codes include 090400 to 091099

	PQ	20,406	30,806	11,683	4,875	-	0% 100%
	SK	-	24,182	33,432	-	-	0% 100%
		65,054	70,978	49,900	8,206	21,770	100%
Caraway Seeds							
	SK	580,690	1,158,754	1,385,858	2,233,773	3,052,167	65%
	MB	1,404,539	896,080	626,527	851,226	1,175,381	25% 90%
	AB	165,914	223,654	273,995	257,400	186,588	4% 94%
	BC	-	-	5,113	-	108,325	2% 96%
	ONT	646,965	205,682	39,068	121,524	92,060	2% 98%
	PQ	-	-	-	-	86,449	2% 100%
		2,798,108	2,484,170	2,330,561	3,463,923	4,700,970	100%
Fennel Seeds; Juniper Berries							
	ONT	-	2,847	-	-	7,651	100%
	BC	-	1,825	-	-	-	0% 100%
		-	4,672	-	-	7,651	100%
Mixtures							
	ONT	989,286	698,292	631,354	309,530	554,048	83%
	PQ	458,139	393,857	117,105	102,665	116,118	17% 100%
	BC	33,180	9,176	5,665	-	-	0% 100%
	AB	2,712	7,526	-	-	-	0% 100%
		1,483,317	1,108,851	754,124	412,195	670,166	100%
Spices Not Elsewhere Specified							
	ONT	96,596	219,563	453,156	314,905	467,130	43%
	PQ	90,187	343,439	356,306	530,216	318,298	30% 73%
	SK	19,011	12,934	119,105	277,000	246,656	23% 96%
	BC	172,774	186,865	4,689	24,519	25,597	2% 98%
	MB	13,910	12,971	-	-	19,103	2% 100%
	AB	-	8,535	147,317	14,694	-	0% 100%
	NB	-	10,250	-	-	-	0% 100%
		392,478	794,617	1,080,573	1,161,334	1,076,784	100%

Source: Strategis[93]

[93] http://strategis.ic.gc.ca/sc_mrkti/tdst/engdoc/tr_homep.html; HS Codes include those relevant to the selected spice.

Table 33 - Canadian Imports of Spices (expressed in Canadian dollars)

	1996	1997	1998	1999	2000	% of 2000 total	Cumulative %
India	13,095,718	18,075,827	23,646,645	26,697,004	23,677,413	26%	
United States (U.S.)	16,583,230	17,436,323	18,257,078	15,920,682	14,855,074	16%	42%
Indonesia (includes East Timor)	7,354,136	6,501,225	10,651,991	11,168,340	13,208,558	15%	57%
China (including Mongolia)	1840,014	2,412,813	2,622,266	3,811,334	5,171,646	6%	63%
Spain	1,706,372	2,257,090	2,668,047	4,133,071	4,741,994	5%	68%
Thailand	1,369,993	2,072,512	2,277,593	2,507,270	2,728,466	3%	71%
Malaysia	1,663,142	2,974,243	3,071,760	4,829,656	2,358,668	3%	73%
Netherlands	226,306	152,269	445,826	1,545,831	2,276,116	3%	76%
Madagascar	4,157,092	4,300,811	3,389,080	3,299,901	1,973,277	2%	78%
Turkey	1,241,984	1,551,491	1,562,538	1,987,730	1,659,230	2%	80%
Brazil	1,440,671	1,279,939	1,394,605	2,923,563	1,429,719	2%	82%
United Kingdom (U.K.)	695,637	882,436	1,132,436	1,374,333	1,398,604	2%	83%
Grenada	452,112	764,192	876,292	1,347,081	1,175,283	1%	84%
Guatemala	543,876	582,112	671,912	1,145,924	1,092,313	1%	86%
Vietnam	175,634	312,131	164,848	444,248	923,845	1%	87%
France (includes Monaco and Andorra)	522,652	510,492	678,902	978,957	911,385	1%	88%
Sri Lanka	422,509	472,257	243,391	693,045	762,406	1%	88%
Jamaica	615,034	808,327	697,083	751,843	699,743	1%	89%

Source: Strategis[94]

5.5 Saskatchewan

The report completed by KPMG in 1999 titled "Strategy for the Saskatchewan Nutraceutical Network" stated that there are about 200 herb producers in Saskatchewan. Herb production in the province has increased while the production of spice crops appears to have leveled off. Estimates of current herb acreage are less than 100 acres. More producers are moving into the market without considering the ease at which markets can be flooded.

5.5.1 Spice Production Problems in Saskatchewan

The primary spice production in Saskatchewan is coriander and caraway. In 1999, it was estimated that 10,000 acres of Caraway were grown and 25,000 acres of Coriander.

There are many species of these crops; however, they all can fall victim to disease. Dr. Lorne Duczek of the University of Saskatchewan has studied these spice plants in the Saskatchewan climate. His findings point out a significant threat to producers and expected yields.

[94] http://strategis.ic.gc.ca/sc_mrkti/tdst/engdoc/tr_homep.html; HS Codes include 090400 to 091099

There are many fungi that affect Caraway and Coriander, which results in Blight symptoms which destroys new shoots and blossoms. The fungi live in the seed and the blooming season is too long to allow for fungicides to work effectively. Once Blight begins in fields there is a resulting loss of 80-100% of yield. This is a large risk to crops and currently there is no protection available. Once the Pathogens are in a farmer's field there is no way to control them. Since it is borne from the seed no ground treatment will help. Australia and Europe have already ceased production of these spices due to the disease. The area's more affected by blight are around the Prince Albert and Esterhazy area where it is cooler and has longer wet seasons.

So far, seeds cannot be engineered to be resistant. However, once they are engineered there will be the issue of GMO's being refused by customers. An acceptable solution is still to be found.

Saskatchewan-grown Anise is having difficulty in the spice trade. Talks with Saskatchewan brokers of Anise said there were serious quality issues with the 1999 harvest. 600,000 pounds were grown in Saskatchewan with only a small percentage of that total being sold. Buyers refuse to accept the quality and therefore it is stuck in storage in the hopes of selling. However, quality continues to decrease with the extended amount of storage time.

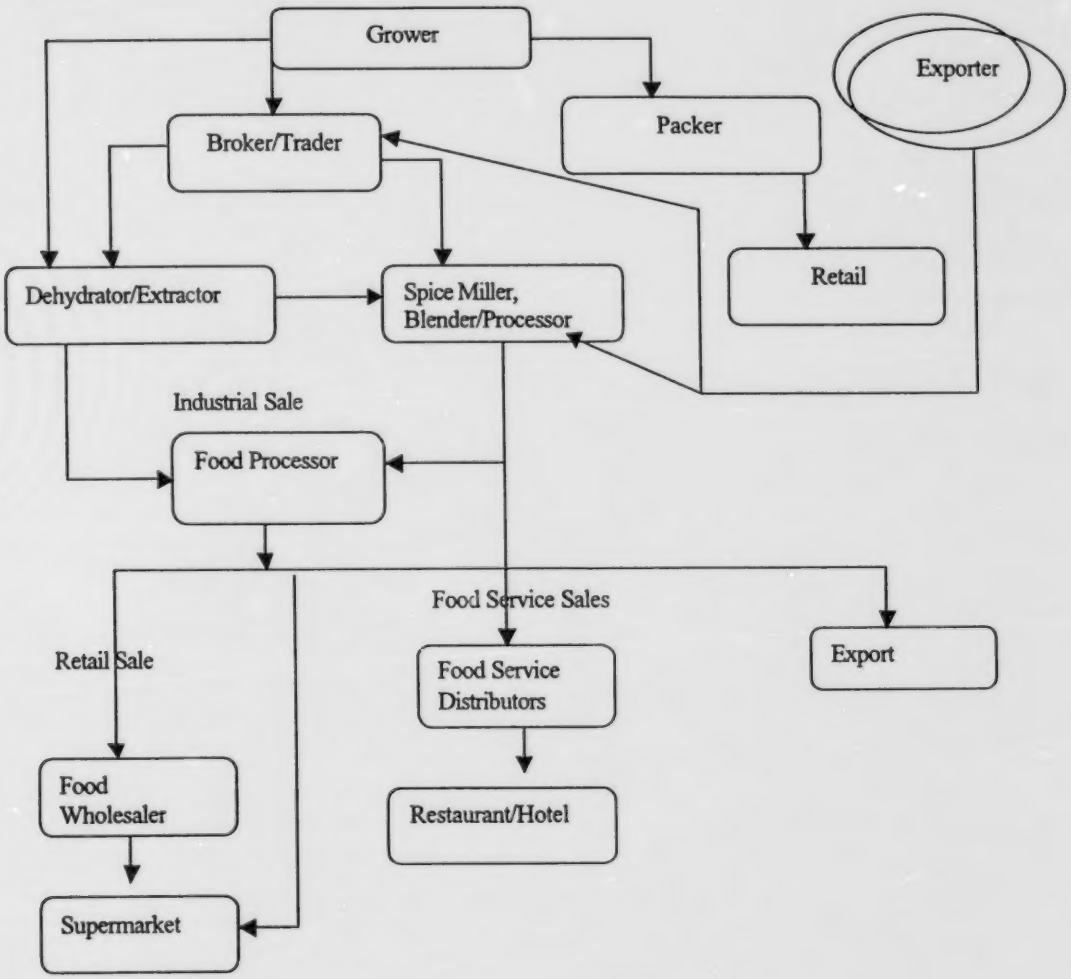
Brokers informed us that consistency is still lacking in the Saskatchewan spice growing industry.

5.6 Processing

Various mills are needed to process the leaves, seeds and bark of the spices. By using mechanical sifters the miller can regulate the fineness of the grind as well as do any extracting that might be demanded by the end user.

5.7 Distribution Channels

The distribution channels for both the spices and dried culinary herbs are similar. As such, the following flow should be interpreted for both spices and dried culinary herb products.



Distribution channels for herbs and spices are fairly extensive. An example is Golden Bough Herbs in Vancouver, which purchases packaged herbs for the Blue Ribbon brand name. Golden Bough buys from a middleman in California who in turn purchases herbs and spices through additional distribution channels in exporting countries.

Typically, brokers purchase their spices from agents in the countries where the herb is grown. Brokers, either from the exporting or importing company, will coordinate transportation and facilitate distribution. Some brokers use the US spot market to fill orders.

A recent trend has been the elimination of the broker, whereby processors buy directly from the exporter.

The end-buyers of spices are retailers, foodservice or food processors in the meat, bakery, seasonings and beverage industry.

5.7.1.1 Key Culinary Market Segments

- Food Processing Companies: General Foods, Campbell's Soup.
- Hotel/Restaurant/Institution (HRI): Use herbs in the preparation of consumer food products.
- Herb and Spice companies such as McCormick's and Spice Island: Sell dried/powdered herbs directly to the consumer.

5.8 Key Players

There are many companies involved in the various parts of the distribution channel. These include the following:

5.8.1 Agents

- Demeter Agro Ltd. (Agents)
  Lethbridge, Alberta
  (403) 329-4111

- Shah Trading Co. Ltd.
  Scarborough, Ontario
  (416) 292-6927

- Ecom Trading Corporation
  Toronto, Ontario
  (416) 298-6085

- Buchanan Trading Inc.
  Toronto, Ontario

5.8.2 *Distributors*

- Avena Botanicals
  Walpole, ME
  (207) 594-0694

- Blessed Herbs Inc.
  Oakham, MA
  (508) 882-3839

- Frontier Natural Products Co-Op
  Norway, IA
  (319) 227-7996

- Golden Bough Herb Co. Ltd
  Vancouver, British Columbia
  (604) 322-0455

- International Flavours And Fragrances
  Hazlet, New Jersey
  (908) 329-5531
  www.iff.com

- White Crane Productions Inc.
  New York, New York
  (201) 795-3300

5.8.3 *Spice Miller/Manufacturer*

- Celestial Seasonings
  Boulder, Colorado
  (303) 530-5300

- Helman Associates International Inc.
  Pleasanton, California
  (510) 484-5000

- Griffith Laboratories Ltd.
  Scarborough, Ontario
  (416) 288-3050

- Horton Spice Mills Ltd.
  Uxbridge, Ontario

(905) 475-6130

- McCormick Canada Ltd.
  Missisagua, Ontario
  (905) 678-1220

- Starwest Botanicals Inc.
  Rancho Cordova, California
  (916) 638-8100
  www.starwest-botanicals.com

5.8.4 Extractors

- Quest International
  Bussum, Netherlands
  www.questintl.com

Further details on these companies can be found in the Buyers List, Section 18 of the report.

5.9 Grading System for Culinary Herbs & Spices

While a formal grading system for herbs and spices does not exist in Canada, Canadian producers follow the guidelines set by the American Spice Trade Association. Color, aroma and texture are key elements that govern the determination of quality within the industry.

5.10 Prices

Global spice prices are very volatile, and the huge price increases that frequently occur are primarily due to shortages in supply and not increased demand. As well, spices are a commodity. This means that there is virtually no product differentiation; thus, one tonne of pepper is fairly interchangeable with another tonne of pepper. As a result, individual suppliers are price-takers within the market, and must conform to the market price.

Coriander, a necessary ingredient in a variety of prepared foods, tobacco and liquor flavorings, is a good example of this volatility. As supplies dwindle anxious buyers bid up the price levels for the diminishing supplies to secure their annual requirements and the price again rises to higher levels.

6 Fresh Culinary Herbs

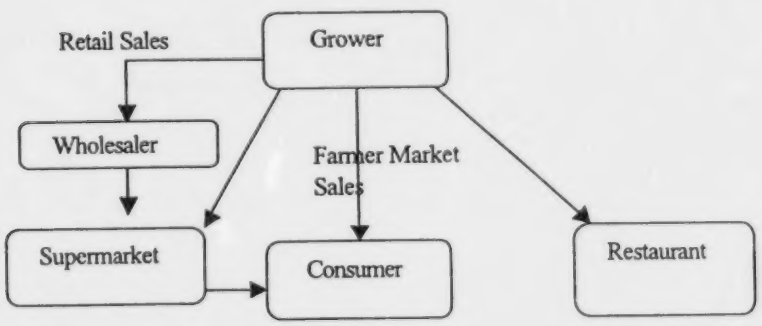
The fresh herb market continues to increase in response to consumer demand fueled by greater public awareness for herb utilization in food preparation. France, traditionally one of the world's largest producers of fresh herbs, has been unable to meet the demand for local supply and increasingly imported fresh herbs.

Historically, limited shelf life has restricted the marketing options for fresh herbs, which has necessitated short distribution channels. This necessitated production within close proximity to markets. However, with improvements in transportation and technological advances in handling and storage marketing options have expanded such that fresh product can be supplied in North America from almost any location. This is evidenced by fresh herbs being shipped from California to Canada.

6.1 Distribution Channels

In the interests of providing a market place with the freshest product possible and to minimize handling of the product, a number of herb and spice companies have started contracting directly with growers. After packaging, herbs are usually sold by various distribution methods.

- Direct from Producer to Consumer: The producer sells direct to the consumer, i.e. Farmer's Market.
- From Producer to a store or restaurant - Wholesale Company i.e. McDonalds Consolidated (Canada Safeway)
- From Producer to a Wholesale Company/Distributor - i.e. jobbers, repackers, wholesale companies, grocery stores or HRI trade.



6.2 Market Expansion Opportunities

Fresh culinary herbs are in very high demand since healthy eating and cooking are becoming more and more important in our daily lives. Fresh herbs add a great deal to both flavor and presentation of foods while reducing salt and calories in food preparation. Fresh herbs are high value crops that can be successfully grown without the use of pesticides.

However, to minimize quality loss and add value to culinary herbs and fresh herb products, optimum post-harvest protocols and new modified atmosphere packaging systems need to be developed.

Currently there is little information available and little industry knowledge of the proper post-harvest handling practices for fresh culinary herbs. In particular, there is considerable confusion as to how to package herbs.

Research done in Australia has identified that storage at the correct temperature can increase the shelf life of all herbs substantially. Storage at 3°C to 4°C rather than 8°C (which is a common storage and retail display temperature) increased the storage and shelf life of some herbs by nearly 50%. Modified atmosphere packaging increased the storage life of herbs under both temperature regimes. Information generated by this project is in use by industry with one company exporting substantial volumes of fresh herb products.

Specifically, the results indicated that:

- Coriander, continental parsley, mibuna, rocket and supreme cress respire less at 0 °C and 3 °C. They suffer less leaf yellowing and soft rot when stored below 4 °C.
- Coriander, continental parsley, mizuna and rocket all respond well to controlled atmospheres containing 10 per cent C02 and 10 per cent 02. Supreme Cress responds best to the 5:3 and 5:5 C0 2 atmospheres.
- Chervil and continental parsley store as well in high humidity as in controlled atmospheres.

This project is an example of what can be accomplished with good handling and packaging protocol, which can increase the storage life of herbs substantially, compared to existing practices. Consequently, wastage will be reduced and new market opportunities can be developed.

7 Herb and spice crops that can grown in Saskatchewan

The following herbs and spices that either can be grown in Saskatchewan or believed to have the potential to grow in Saskatchewan have been listed. Input on this list has come from Branka Barl, of the University of Saskatchewan, Kelley Fitzpatrick, of the Saskatchewan Nutraceutical Network (SNN), Harvey Clark, of the Saskatchewan Irrigation Diversification Centre (SIDC), Richard Miller, a consultant and trader, Ray McVicar and Brian Porter, of Saskatchewan Agriculture and Food (SAF), and Alison Ferrie, of the Plant Biotechnology Institute.

The attempt has been to identify plants with agronomic potential and economic potential. The appendix identifies the work that has been done on estimating production costs.

Producers reading this report are cautioned to do their own due diligence on cultural practices, market prices and risks. Many of these plants are in the process of being investigated by the scientific community as to their efficacy levels when grown in Saskatchewan and as to their appropriate agronomic practices.

It must be recognized that this industry is typified by cyclical highs and lows. Producers must recognize that with the lead times between planting and harvesting, prices at harvest may be below the costs of production. Producers must be prepared to store the product until prices rise.

SAF had conducted a survey of producers to identify the volume of crops planted in Saskatchewan. In consultation with a number of people this report was viewed to be conservative, due to not all producers responding and secondly, due to the secrecy of this industry, resulting in a reluctance to provide full detail. For this reason, and the fact that Statistics Canada provides no meaningful numbers, the results of the production survey for each crop were ignored.

The point was emphasized by a number of individuals that it is important to present a balanced and cautious view about many of these plants as production is just getting underway with a number of them. Readers are cautioned not to make negative judgments until the agronomic research is completed.

In a similar fashion the production costs must be viewed as tentative, as they are done under conditions of plot trials and actual results will vary, in some cases considerably.

The following analysis does not go into extensive detail on the uses and claims for the product as these are identified elsewhere in the report.

7.1 Culinary Herbs and Spices

7.1.1 Caraway

Caraway, a biennial, can be grown successfully on a wide range of soils and regions in Saskatchewan. The plant can be seeded on an annual basis or treated as a biannual. There are uses for both the seeds and the oil. The major problems facing caraway production include winter-kill (if snow cover isn't sufficient), aster yellows, insect problems, weed competition and shattering at harvest. Dr. Slinkard is reported to be concentrating on annual seeding, as the plant suffers from winter-kill. Production in Saskatchewan is estimated at 18,000 acres for 2000, reflecting continued expansion of acres. Typically, caraway production fluctuates between over-production and under-production. Currently, expected prices are above the estimated cost of production. As a result, there is a temporary oversupply of caraway, but the crop should remain competitive for Saskatchewan in the longrun. With the main market being Holland, supply and price is controlled by the Dutch buyers.

7.1.2 Coriander

The fresh green herb is used for cilantro for flavoring, and the essential oil is used for flavoring. Coriander is an annual herb best adapted to well-drained, non-saline loamy soils of moderate to high fertility. It is best adapted to western Canadian conditions. There are several varieties. The major problems facing coriander include grasshopper infestations, root diseases (such as flower blight), weed competition, and shattering at harvest. It is, therefore, a high-risk crop. The total number of acres seeded to coriander in Saskatchewan for 2000 is estimated to be 20,000.[95] The tendency has been to overproduce following the high prices of two or three years ago. In discussion with an experienced broker in the industry, he recommends against further increase in acres for the short-term. For the long-term, though, he expects that this crop will remain competitive.

7.1.3 Fenugreek

This plant is used for culinary spice flavoring and fragrance. Initial research indicates that fenugreek is best adapted to loam soils in the southern areas of the prairies. However, it is generally grown in a more temperate climate, and it may be that our season is too short. Other problems include weed competition, cercospora leaf spot (a plant disease that can completely destroy the crop), root rot organisms, powdery mildew, and insect pests such as blister beetles and aphids. One advantage is that the crop can be mechanically harvested. It is estimated that, for the year 1999, there was 500 acres of

[95] Saskatchewan Agriculture and Food, "2000 Specialty Crop Report."

fenugreek planted in Saskatchewan. This should be considered a high-risk crop until more production information becomes available.

7.1.4 Dill

It tolerates most soils, but thrives best in rich, moist, well-drained soils. Dill is sensitive to low moisture, high temperature, hard rains and other stresses. Insect pests of dill are aphids, the green and black parsley worm, and larvae of the swallowtail butterfly. As well, it is not a good competitor with weeds. It is estimated by SAF that, for 2000, there was 400 acres of dill planted in Saskatchewan. It is reported that some producers are switching from spearmint to dill in Saskatchewan. Due to droughts in India this year, dill production has brought in above average profits. Currently, Saskatchewan Wheat Pool is offering 50 cents per pound, but this is expected to be temporary. There are 3 markets for dill: dillweed for essential oil, planting seed, and dillweed, which can be dried and sold as a herb.

7.1.5 Cumin

It is widely used as a flavoring spice, and the oil can be used in perfumes. It grows best on fertile, sandy loam soils, and prefers cool, moist summers. It is best adapted to the Black soil zone of western Canada. However, it is new to western Canada, and agronomic practices for production are still being researched. Cumin is reported to suffer from disease problems. According to Clark, there is also some question about the integrity of planting seed received from India. It should, therefore, be considered a high-risk crop until more information is available.

7.1.6 French Tarragon

This crop requires shelter from the wind, and it can be susceptible to grasshopper infestations. Currently, there are no registered crop protection products for it. As well, views are mixed on its ability to over-winter. Currently, the Plant Biotechnology Institute (PBI) is not working on this crop. It is used as a herb to make vinegar, and is used in mustards and pickles. The culinary markets are small, but growing. The plant does have oil content; however, the reports on the use of its essential oil are mixed, as some report it to be used in perfumes, while other reports claim the oil is toxic.

7.1.7 Fennel

Agronomic suitability for Saskatchewan is unknown. It may require a long growing season, according to one report from North Dakota (Brian Porter, SAF). PBI has been working on this, with some success.

7.1.8 *Oregano*

Agronomic suitability for Saskatchewan is unknown. It is likely that hardy types of oregano would be needed; however, hardy types of oregano probably have little or no marketable value (Brian Porter, SAF).

7.2 Medicinal Herbs

7.2.1 *Borage*

Borage has a sizeable market potential, as it is considered useful in relieving skin conditions and reducing rheumatoid arthritis inflammation and joint pain. Agronomically, it is well adapted to the cooler, moister areas of Saskatchewan, though it has a poor drought tolerance and should be grown in the Black soil zone. It has not shown itself to be able to capitalize on the advantages of irrigation due to an indeterminate harvest. The major obstacle facing borage is broadleaf weeds and shattering on harvest. The only known insect problem for borage is thistle caterpillar. According to SAF, about 25,000 acres of borage was planted in Saskatchewan in 1999, which represented three years supply of the crop. Some major producers are still not contracting borage acres in 2001.

7.2.2 *Echinacea Augustifolia*[96]

It is best suited for a poor to moderately rich, well-drained soil. It is currently grown in southern and northern parts of the prairies. There are difficulties in cultivation, with poor seed germination being the primary obstacle. Other problems are weed competition and high initial costs to establish production. Few insect or disease problems have been reported, though aster yellows are becoming a significant disease for Echinacea in Saskatchewan and Alberta. It is frost resistant and winter hardy, provided there is snow cover. Sometimes a better-formed root is obtained using irrigation only in the early stages but growing in dryland areas. The total production of Echinacea in Saskatchewan for 2000 is estimated to be 40 acres, with about 40 producers in total.[97] It is reported by several traders that Saskatchewan product is lower in quality, but this may be a temporary situation. One trader reports the finest Echinacea augustifolia is grown in Montana, Wyoming, North Dakota and Alberta, of better quality than Saskatchewan and Ontario, as shown by level of echinacosides. The crop was described by one trader as "habitat-sensitive," as opposed to cultural-sensitive, meaning that it is critical where it is grown. It is too early to determine whether Saskatchewan can meet the long-term quality requirements of the market. However, the crop is native to southern Saskatchewan, and

[96] "Echinacea Infosheet," Department of Horticulture Science, University of Saskatchewan, 1996.
[97] "Production Survey Analysis," Saskatchewan Herb and Spice Association and Saskatchewan Agriculture and Food, p. 2.

may, therefore, still hold some long-term market potential. Current market prospects are dim, as plentiful supplies are driving prices downward. However, the long-term market potential is more optimistic. As new markets, such as pet supplements, are developed, the demand for Echinacea will grow, and there will be an opportunity for Saskatchewan growers. Producer returns on the crop are still reasonable, but market outlets in Saskatchewan may be limited. For this reason, as with most herb crops, the success of an Echinacea enterprise rests on the marketing of the crop. Currently, research is being conducted concerning its effectiveness in treating cancer. As well, there is speculation as to its effectiveness in alleviating the symptoms of AIDS (Clark, SIDC).

7.2.3 St. John's Wort

This crop has received a lot of interest, due to its suitability as a substitute for Prozac in the treatment of depression. It is being used in aromatherapy and is being investigated for the treatment of HIV. It is adapted to dry areas, and mature plants have good drought tolerance. However, there are several obstacles to production. First, it requires care in harvesting and processing. As well, it is listed as a noxious weed in a number of provinces and states, and should, therefore, be planted with caution in Saskatchewan, with grower being prepared to keep it under control. However, winters should assist in helping address the weed concern. No significant disease or insect problems have been reported in Saskatchewan to date, but this could change once acreages increase. It is estimated that, in 2000, the total acreage of St. John's Wort in Saskatchewan was 1 acre.[98] Currently, the crop is being wild-crafted. The viability of commercial production in Saskatchewan has yet to be determined, though significant work is being done in Outlook by the SIDC. The major obstacle is proving that Saskatchewan can grow it at competitive costs of production. As well, Saskatchewan is still learning how to market the crop. An experienced trader recommended against the crop for Saskatchewan in the short-term due to the large inventories of unsold product in the market.

7.2.4 Ginseng

Canada is believed to be the third largest ginseng-producing country, after China and Korea, and the leader in North American ginseng production. Canadian ginseng production in 1999 was estimated at 2,200 tonnes, of which 60% came from Ontario and 40% from British Columbia. The major market is China, with production sold to brokers who visit Canada to buy the product. Obstacles of production include high capital investment costs, susceptibility to disease, poor competitor to weeds, winter kill or low temperature damage, a long maturing period, and a lack of local information on commercial production.[99] Therefore, it must be recognized as a high-risk venture for Saskatchewan producers. As well, the crop takes 7 years to grow in Saskatchewan, as compared to 45 years in British Columbia and 34 years in Ontario. The shorter season in Ontario is due to cycle reduction, in response to disease problems. The cost of

[98] "Production Survey," p. 2.
[99] "Ginseng Industry," Ag-Ventures, Alberta Agriculture, Food and Rural Development, p. 2.

production in Saskatchewan is approximately $25 - $30/lb, as compared to $15 – $20/lb in British Columbia and Ontario. Woods cultivation of ginseng may prove to be viable in Saskatchewan, but information is still lacking. PBI reports that they are not doing any work with this crop, reflecting the general consensus that Saskatchewan cannot be competitive in this crop.

7.2.5 *Feverfew*

It should be grown in well-drained soil in a sunny location. It is quite adaptable to most soils. Disease and insect problems are not well documented in Saskatchewan, though it should be grown away from other crops such as caraway and Echinacea, which are known to be susceptible to aster yellows disease. Although it is considered a semi-hardy perennial, it is susceptible to winterkill in Saskatchewan, but can be grown as an annual. The total production of feverfew in Saskatchewan in 2000 is minimal, with the total number of producers being 5.[100] Demand has grown recently, but overproduction is expected to limit the opportunities for new growers (Clark, SIDC). The cost of production for feverfew in Saskatchewan has not yet been documented.

7.2.6 *Burdock*

It is an ingredient in the essiac formula used for cancer treatment, in combination with sheep sorrel, turkey rhubarb root, and slippery elm bark. As a result of its properties that are useful for nutraceuticals and preventive health care medicine, there is a demand for burdock. It is fairly adaptable to most soils, but thrives best in moist soil and full sun. Harvesting the long roots is a challenge to be overcome. It needs a light textured soil to assist in the root removal. It is a good weed competitor, and seems to be relatively pest and disease free, though this may change once acreages increase. Commercial production has only recently begun in Saskatchewan, and therefore no production statistics are available. It is easy to produce and, as a result, the price is not high.

7.2.7 *Hemp*

Low THC hemp appears to be well suited to the Prairies. To date, it appears that hemp is best suited to areas with moderate rainfall and good soil fertility. Further testing is required to determine the areas of Saskatchewan best suited for production. After a crop is established, hemp becomes a strong competitor to weeds. The problems facing hemp production are root rots and leaf spots diseases, as well as insect control. In anticipation of large sales of hemp to the US, it has recently been promoted in Manitoba by its provincial government. However, Saskatchewan production is limited. It may have some long-term market potential, due to the demand for oil, which can be used in

[100] "Production Survey," p. 2.

cosmetics. Work is being done on this crop by several groups, including the University of Saskatchewan. Production costs for Saskatchewan are currently not available.

7.2.8 Astragalus

Astragalus, or Milk Vetch, includes many species that grow around the world. There are several which are native to Saskatchewan; however, none of the native species are grown commercially.[101] Some species have become popular of late due to their medicinal properties. Limited information is available on its agronomic potential, but it is reported to have a growing and steady market demand. The plants are adapted to deep, alkaline soil and need very good drainage and full sun. As yet, pests have not been a problem, but some disease has occurred. It has recently been planted in Saskatchewan, though the number of producers is less than 5, with an estimate of 5,000 plants in total.[102] Prices are around $3 - $7/lb US.

7.2.9 Evening Primrose

Interest in the plant has grown because it consists of 9-11% gamma linolenic acid, which may help lower cholesterol and blood pressure. It is a high-cost plant, with costs not including land and capital reported to be $500 per acre. It was not proven itself to be winter hardy in Western Canada. It can be grown as an annual using greenhouse production in the spring but with a higher cost of production than Ontario or China. It is a competitor in usage for borage, which can be more easily grown in this Saskatchewan.

7.2.10 Anise

It prefers sandy, moist, well-drained loam, in full sun or very light shade. The major problems facing production are weed control, and susceptibility to beetle and bug attacks. There are uses for both the herb and the essential oil, and it is used as a substitute for licorice seed. Demand for anise is fairly steady. SAF estimates that there were 300 acres of anise planted in Saskatchewan in 1999. It is unclear whether Saskatchewan can be competitive in the production of this crop. The reason is because yield may be lower, as growers are frequently unable to get proper maturity of the crop because of the longer growing season.

7.2.11 Valerian[103]

Direct seeding into the field reduces labour costs and eliminates the need for greenhouse facilities; however, lower germination rates and uncertain winter survival increases the

[101] Saskatchewan Agriculture and Food, "Astragalus in Saskatchewn," April 2000, p.1.
[102] Ibid., p. 2.
[103] "Valerian Infosheet," Department of Horticulture Science, University of Saskatchewan, 1996.

risks of this method. SAF reports that Saskatchewan producers have experienced aster yellows disease and root-rots. Weed control is also understood to be a problem. Rough estimates are that the total number of valerian plants grown in Saskatchewan in 2000 was 3,100.[104] Demand has grown but overproduction is expected to limit the opportunities for new growers. It does not do well in Saskatchewan under irrigation, as a very long root is required. It can be started with irrigation but will grow best in dryland areas once started on irrigation, as a long root is required. Demand is high due to the desired shape of the root.

7.2.12 *Milk thistle*[105]

It is an undemanding plant, tolerating a range of growing conditions, but requiring full sun and well-drained soil to thrive. It must be treated as a spring planted annual, because of the cold winters. It is troubled by few diseases or insect pests and is a good weed competitor once established. Rough estimates for 2000 are that the total number of milk thistle plants grown in Saskatchewan was 55.[106] SAF report that a limitation of this plant is that the seed maturity is non-uniform and much seed can be lost prior or during harvesting. It has an established production in Europe and South America, which may make it difficult for Canada to compete, due to the longer growing seasons of these regions.[107] The economics of production are favourable.

7.2.13 *Scotch Spearmint*

There were 900 acres of spearmint planted in Saskatchewan in 1999.[108] Irrigation is required to ensure good yields and better over-wintering, as there are concerns about whether Saskatchewan is too far north for this crop. Given Saskatchewan's cost of producing this crop, current prices are too low to make production profitable. However, if the costs of production can be lowered, there may be long-term potential for this crop. Weeding by hand is recommended. People in the normal growing areas of spearmint in the US are sceptical about Saskatchewan being a producer due to winterkill, but producers on the prairies are optimistic.

7.2.14 *Horseradish*

Currently, this is not being produced in Saskatchewan. It has been grown for culinary purposes in Ontario, and is used for medicinal purposes in Manitoba. It is believed that it

[104] "Production Survey Analysis," p. 2.
[105] "Milk Thistle Infosheet," Department of Horticulture Science, University of Saskatchewan, 1996.
[106] "Production Survey," p. 2.
[107] Harvey Clark, Canada-Saskatchewan Irrigation Diversification Centre, Presentation to the PFRA Today Symposium, March 1, 2000.
[108] "Production Survey," p. 2.

could be grown here, but marketing it as a culinary herb would be difficult due to competition. The overall potential is not viewed as high.

7.2.15 Comfrey

Estimates for 2000 are that the total number of plants grown in Saskatchewan was 250.[109] If irrigation is used, an experienced trader believes that this crop has tremendous potential in Saskatchewan as an animal feed, due to its medicinal properties. However, the economics of production would need to be determined. Currently, comfrey cannot be sold in Canada for internal use in humans. The problem is in handling, as it is very high in biomass. Questions have been raised about the validity of the testing done on this product in the US, which has led to it being classed as a restricted herb. Currently, PBI is not working on this crop.

7.2.16 Licorice

Rough estimates for 2000 are that the total number of plants grown in Saskatchewan was 1,025.[110] An experienced trader is not sure that he would recommend growing this crop for all areas of Saskatchewan. SAF reports that the plant may be suitable if snow cover is reliable. PBI is not working on this crop at this time.

7.2.17 Sea Buckthorn

SAF estimates that, for 2000, the total number of this crop grown in Saskatchewan was 350.[111] This is a medicinal fruit that has been brought in from Asia, and is popular as a drink in Russia and China. If a demand for this crop develops in North America it is anticipated that Eastern Europe would flood the market. Currently, B.C. and Saskatchewan are working on this together, and costs of production numbers are available, indicating the potential for profit. It is typically grown as a shelterbelt. PBI is not working on this plant at the moment.

7.2.18 Chamomile

It is a perennial that can be grown as an annual. Normally, it is harvested first for herbal teas and the remainder is distilled as an essential oil (Clark, SIDC). The flower consists of 0.3 to 1.5% essential oil. The flowers are dried and used in teas, and the oil is highly valued in aromatherapy. Chamomile has an established production in Egypt and France but also grows well on the prairies. Rough estimates for 2000 are that the total number of

[109] Ibid.
[110] Ibid.
[111] Ibid.

plants grown in Saskatchewan was 50.[112] Harvesting the flower is the major concern with this crop. Prototype technology exists that would allow the crop to be harvested mechanically, rather than by hand. An experienced trader advises that this would provide a significant cost advantage, and with this cost advantage acreage could increase by 20,000 acres in North America. Yields in Ontario trials are reported to have exceeded direct seeded acres in Saskatchewan.

7.2.19 Angelica

Market potential at this time is undetermined. Agronomic suitability to Saskatchewan is reported to be good on SIDC demonstration plots. However marketing opportunities are unknown.

7.2.20 Calendula

A common garden flower that is widely grown in Saskatchewan. It is susceptible to aster yellows disease, which may limit its potential. It prefers a slightly cooler climate, and may need irrigation for good yields. Currently, agronomic suitability of this crop to Saskatchewan is unknown. If Saskatchewan had the capability to harvest the flower heads it could meet a lot more of the market potential for this crop. However, an experienced trader reports that the market potential for use in cosmetics is limited.

7.2.21 Lovage

It is a member of the celery family. Its agronomic suitability to Saskatchewan is presently unknown. There is a limited culinary market, but it does contain some medicinal properties as well, which may have future market potential. It is reported to have naturalized to western Canada and may do well here, but currently acreage potential is limited. At SIDC, it has performed well on the demonstration plots.

7.2.22 Black Cohosh

It is a root crop with agronomic suitability to Saskatchewan presently unknown. It may require irrigation, according to SAF. It is reported to require shade cover and may be better suited to areas other than Saskatchewan. According to Kelley Fitzpatrick of the SNN, it is a plant that has treatment qualities for pre and post menopause. Clinical verification of PMS and menopause is lacking but it is viewed as having potential.

[112] Ibid.

7.2.23 Goldenseal

It is a root crop traditionally grown under conditions similar to ginseng, and with high start up costs. An experienced trader believes that this crop has potential for production in Saskatchewan. It likely requires mulching and/or very good snow cover in order to winter successfully. According to SAF, some growers have had high casualty rates. However, according to the SNN, the product is being sold based on historical traditions rather than science, and is used in combination with Echinacea and other herbs for improving the immune system. It is native to the US mid-west and is difficult to grow both in and outside of its native area. Saskatchewan production experiences has been mixed (Clark, SIDC). It commands a high price and is in high demand, due to the reduction of wildcrafting supplies. Whether it can be grown in Saskatchewan is unclear but, due to its high price, further research is warranted. Currently, it is on Canada's restricted list and PBI is not working on this plant.

7.2.24 Tribulus

It is reported to have multiple medicinal uses, such as being a natural viagra. It is difficult for growers to harvest due to its sharp spikes on the "seed bur". It is a widespread weed around the world and is listed as a noxious weed in Arizona, California, Colorado, Iowa, Nevada, Oregon, South Dakota, Washington, Nevada and BC. It is well suited to dry sandy soils and wasteland. Agronomic suitability has not been studied by any government agency. There is also concern about toxicity to sheep and cattle.

7.2.25 Stinging Nettle

This crop is reported to be cultivated by SIDC in Outlook, and some preliminary agronomic information is, therefore, available. It seems to be easily grown, though there is some concern that hand weeding adjacent to the plants is hazardous. Its use has mainly been in controlling benign prostrate problems in men. It is viewed as high potential from a marketing standpoint, because of its use in reducing symptoms of Prostatic Hyperplasia (urinary difficulties associated with enlargement of the Prostate Gland). However, no costs of production figures are currently available.

7.2.26 Red Clover

It is reported that it is used for medicinal purposes, such as venereal disease and cancer, though there are some questions regarding its effectiveness. As well, a market exists for its use in perfumes. Currently, agronomic suitability is unknown for Saskatchewan.

7.3 Priorities

All the crops listed below have significant market potential. Some of these crops can be taken advantage of immediately, whereas others have more of a long-term market potential. For example, Echinacea is currently in oversupply, but as new uses for the herb are developed, such as pet supplements, there will again be a market opportunity for producing the crop. The agronomic viability of each of the following crops has been described in detail already. Some of these crops are being grown in Saskatchewan on a commercial level, while the agronomic suitability of others is still being studied. Overall, though, the view of the various agricultural experts that were interviewed is that each of these crops can be grown in Saskatchewan. However, it must be pointed out that the production of each of these crops must still be considered a high-risk endeavour. For this reason, each of these crops should also be considered a priority for Saskatchewan in terms of research and improved agronomic practices.

- Goldenseal
- Echinacea
- Dill
- Coriander
- Borage
- St. John's Wort
- Hemp
- Sea Buckthorn
- Comfrey
- Chamomile

It has been suggested that one approach is to categorize the above opportunities in terms of the degree of mechanization that can be applied to the crop.

Hand Harvest

- Fennel
- Oregano

Hand Harvest – Leaf or Flower

- Comfrey
- Chamomile
- Red Clover
- Calendula
- Lovage
- Stinging Nettle
- St. John Wort
- Hemp
- Feverfew
- French Tarragon

Mechanical Harvest

- Borage
- Caraway
- Coriander
- Hemp
- Scotch Spearmint

Mechanization and by hand – root crops

- Echinacea
- Ginseng
- Comfrey
- Licorice
- Marshmallow
- Angelica
- Black Cohosh
- Lovage
- Burdock
- Horse Radish

As can be noted, the plants with greatest agronomic suitability also are those that have greater mechanization capability or the potential to utilize mechanization.

7.4 Saskatchewan Production

According the Saskatchewan Herb and Spice Association's Marketing Survey Analysis, approximately 70 different herb and spice crops are produced in Saskatchewan. The top crops, as defined as the percentage of producers surveyed, include:

Crop Type	Percentage of Producers Surveyed (1999)
Echinacea angustifolia	49%
Valerian	22%
St. John's Wort	22%
Caraway	21%
Feverfew	21%
Coriander	16%
Borage	12%
Chamomile	12%
Garlic	9%
Lemon Balm, Peppermint, Catnip, Oregano	7%
Other	18%

The Marketing Survey Analysis also contains other production information, such as expected production for 2000, most common herbs grown in Saskatchewan, harvest yields, use of pesticides, etc.

8 Feasibility Analysis

8.1 Costs of Production and Return - Saskatchewan

Harvey Clark of the Canada-Saskatchewan Irrigation Diversification Centre in Outlook, Sask., has calculated the costs of production for a limited number of herb and spice crops. There are figures for the production of dill oil, milk thistle, and spearmint in Saskatchewan. There is also a comparison of Saskatchewan and B.C. for the costs of producing Echinacea, organic garlic, and ginseng. As well, the cost of production for St. John's Wort in B.C was obtained from another source. Saskatchewan Agriculture and Food has calculated costs on coriander, caraway, fenugreek and borage. Cost of production information is not available in many other competing areas.

Crop	Estimated Yield/acre	Total Fixed Costs/acre	Total Variable Costs/acre	Total Costs/acre	Expected Price	Revenue Per Acre	Net Return Per Acre
Irrigated Dill Oil as at March 2001	35 lbs. oil	$ 289	$ 194	$ 483	$19.90/lb.	$ 697	$ 214
Milk Thistle As at October 2000	350 lbs.	$ 167	$ 402	$ 569	$2.00/lb.	$ 700	$ 131
Spearmint – updated Dec 2000	179 lbs	$1269	$ 1341	$ 2610	$14.69	$ 2630	$ 20
Echinacea Angustifolia – updated as at August 8, 2000	1800 lbs. root, 150 lbs. seed	$3273	$23037	$26310	$25.00 per lb. root, $300/lb. seed	$49500	$23190
Caraway	1176 lbs.	$ 106	$ 159	$ 264	$0.51/lb.	$ 600	$ 336
Dill – On Fallow	800 lbs.	$ 58	$ 67	$ 125	$0.50/lb.	$ 400	$275 before summerfallow expenses
Coriander	758 lbs.	$ 55	$ 94	$ 149	$0.17/lb.	$ 129	$(20.21)
Fenugreek on Fallow	800 lbs.	$ 45	$ 50	$ 95	$0.20/lb.	$ 160	$65 before summerfallow costs
Borage	153 lbs.	$ 53	$ 98	$ 150	$1.30/lb.	$ 199	$48 before summerfallow

When the returns on these crops are compared to other cropping alternatives, the fact that black numbers can be obtained is a real positive for the producer. However, the producers must understand that volume has a big impact on market prices. If a large number of producers jump into these crops, the prices will be significantly impacted.

Saskatchewan Herb & Spice Crops Acres[113]

- 20,000 acres of Coriander planted in 2000
- 18,000 acres of Caraway planted in 2000
- 25,000 acres of Borage planted in 1999
- 400 acres of Dill planted in 1999
- 900 acres of Spearmint planted in 1999
- 500 acres of Fenugreek planted in 1999
- 300 acres of Anise planted in 1999

Although Saskatchewan is a relative newcomer to the industry the volumes of herb and spice acres being grown are respectable.

8.2 Competitor Production Costs

Production costs for herbs and spices were searched in British Columbia, Alberta and Ontario. The Consultants found very limited cost of production information, with the exception of ginseng in both Ontario and British Columbia.

The Consultants also looked for production costs in the United States, specifically Utah. The USDA and the two universities in Utah had no production statistics on herb and spice crops grown in that area. To confirm this we spoke to Maureen Rogers, Director of the Herb Growing and Marketing Network in Silver Springs, Pennsylvania. She confirmed that cost of production numbers are not being kept on herb and spice crops by either the USDA or the U.S. universities. One exception is the University of Purdue, which has done some work on mint production. The University advised that the US consider herbs and spices to be minor crops. There are 300 – 400 small crops, and it is, therefore, a difficult task to consistently track each crop.

Information that was available on production costs is identified below. Saskatchewan is far ahead in this area. In fact, many of the numbers presented below on herbs are adapted from Saskatchewan's analysis.

In order to assess the competitive position, the exports of various crops were looked at by province to determine Saskatchewan's relative standing. In addition, of the crops agronomically suited for Saskatchewan, several have cost of production figures. An analysis of the returns from these crops is discussed below.

The following comparison on crops grown in B.C., Ontario, and Washington are presented here for comparison purposes against the information presented earlier on Saskatchewan.

[113] www.agr.gov.sk.ca

Crop	Estimated Yield/acre	Total Fixed Costs/acre	Total Variable Costs/acre	Total Costs/acre	Expected Price	Revenue Per Acre	Net Return Per Acre
Central Washington Spearmint as of 1996[114]	471 lbs.	$1,708	$ 5,238	$ 6,946	$11.90	$ 5,604	$(366)
Echinacacea Purpurea – Alberta[115]	1,250 lbs.		$16,300		$1.50 - $5.50/lb. herb, $15/lb. root	$ 18,750	$2,450 before fixed costs. Using Sask fixed costs ($823) per acre
Feverfew[116] - BC	2,000 lbs		$ 6,260		$4.00/lb.	$ 8,000	$1,740 before fixed costs.
Echinacea – Alberta[117]	990 lbs. Root,	$41,440	$73,669	$115,109	$25.00 per lb. for root	$120,870	$5,762
Ginseng[118] - BC	3,000 lbs dried		$40,215		$37.50 per pound	$192,000	$151,785 before fixed costs
Ginseng – BC interior	3,000 lbs dried	$19,776	$47,681	$67,457			

[114] Provided by Harvey Clarke Saskatchewan Irrigation Development Centre, 1996
[115] British Columbia Ministry of Agriculture and Food.
[116] British Columbia Ministry of Agriculture and Food.
[117] Alberta Agriculture
[118] BC Agriculture

Crop	Estimated Yield/acre	Total Fixed Costs/acre	Total Variable Costs/acre	Total Costs/acre	Expected Price	Revenue Per Acre	Net Return Per Acre
Caraway Seed – Alta without summerfallow costs[119]		$ 180	$ 124	$ 304			
Coriander – Alta without summerfallow costs[120]		$ 60	$ 60	$ 120			
Coriander Manitoba[121]		$ 43	$ 107	$ 150			
Cumin – Alta without summerfallow costs[122]		$ 65	$ 65	$ 131			

[119] Alberta Agriculture
[120] Alberta Agriculture
[121] Manitoba Agriculture
[122] Alberta Agriculture

In the discussions that we had with a number of experienced parties, they informed us that for many crops Saskatchewan has an advantage due to the lower land costs and irrigation costs. For example, in Ontario, land suitable for ginseng production can be worth between $5,000 per acre, if not near an urban area, and $20,000 per acre, if within commuting distance. The analysis of the above competitor's variable costs compared to Saskatchewan costs suggests that Saskatchewan can be very competitive in the following: Spearmint, Echinacea, Caraway, and Coriander.

8.3 Saskatchewan's Trade Position

8.3.1 Medicinal Herbs

In order to better analyze Saskatchewan's competitive position in the absence of adequate production numbers, Canada's exports by province were examined. The following highlights the earlier analysis conducted of medicinal botanicals:

- Total Canadian exports other than ginseng and licorice were $2,404,000 in 2000 an increase of 55% since 1996
- Saskatchewan's exports were third highest in Canada with Ontario at $716,000, Quebec at $653,000 and Saskatchewan at $450,000
- Saskatchewan's exports were $450,000 in 2000, representing 19% of Canadian exports and reflecting a 2038% increase over 1996
- Saskatchewan growth in exports since 1996 were higher than the other provinces by a significant margin as shown below:
  - Ontario's exports grew 19%
  - Quebec's exports grew 88%
  - British Columbia's exports declined 19%
  - Alberta's exports grew 973%
  - Manitoba's exports declined 56%

8.3.2 Spices

- Total Canadian exports of spices were $28,400,000 in 2000 an increase of 74% since 1996
- Saskatchewan's exports were third highest after Ontario and Quebec
  - Ontario share of Canadian exports 29%
  - Quebec share of Canadian exports 28%
  - Saskatchewan share of Canadian exports 20%
- Saskatchewan has a strong position in the crops they are exporting:
  - Anise sales during 2000 were $129,000 of which 100% came from Saskatchewan
  - Coriander exports during 2000 were $3,700,000, an increase of 70% over 1996. Saskatchewan's market share of Canadian exports was 58% in 2000 up from the 1996 market share of 38%.
  - Caraway exports during 2000 were $4,700,000, an increase of 70% over 1996 levels. Saskatchewan's market share of Caraway exports was 65% in 2000 up from 1996 market share of 21%.

8.3.3 *Essential Oils*

- The major purchaser of Canada's essential oils is the US, which imports 91% of Canada's exports.
- Canada is the major supplier to the US, supplying 92% of its imports
- Canada's exports of essential oils totaled $37.5 million in 2000, a 33% increase over 1996.
- Saskatchewan with $929,000 in sales during 2000 is the fourth largest exporting province following behind Quebec, Ontario and Alberta as follows:
  - Quebec 42% of Canada's exports
  - Ontario 42%
  - Alberta 12%
  - Saskatchewan 2%
- Growth in exports since 1996 has not been shared by BC
  - Quebec exports rose 216% since 1996
  - Ontario exports decreased 11% since 1996
  - Alberta exports increased 27%
  - Saskatchewan exports increased 142%
  - BC exports decreased 66%

8.4 Current Infrastructure in Saskatchewan

This portion of the report will outline the facilities and the work being done by various members of the Saskatchewan herb and spice research, government, producer and industry players and contrast this with Ontario, British Columbia and Utah. For ease of comparison and reference, section 18 of the report provides a summary of Canada's national and provincial infrastructure.

8.4.1 *Canada-Saskatchewan Irrigation Diversification Centre, Outlook*

A major issue facing producers throughout Canada has been a lack of available information on production practices that will identify which crops can be economically grown and how to do so.

From our discussions, the Canada-Saskatchewan Irrigation Diversification Centre (CSIDC) has played an instrumental role in working with producers on both agronomic issues as well as supplying market information, the latter of which is not available from other sources to the same degree as shown by the CSIDC. From our conversations with people throughout Canada and the US it appeared that Saskatchewan had the most comprehensive program on the assessment of agronomic varieties and cultural practices.

In 1997, the Canada-Saskatchewan Irrigation Diversification Centre (CSIDC) initiated agronomic studies for several economically important herbs including Echinacea

angustifolia, feverfew, German chamomile, milk thistle, stinging nettle, and St. John's Wort.

The work done by the CSIDC indicated that Saskatchewan producers could be competitive on a number of crops and their returns enhanced with sound agronomic practices:

8.4.1.1 Echinacea angustifolia

Preliminary findings indicate that:

- Transplanted exceeded direct seeded yields
  2300 – 2500 kg/ha on transplanted three-year roots compared to 1100 – 1400 kg on direct seeded.
- Transplanted yields were similar on both irrigation and dryland.

The final numbers used in the Production Practices handout indicated direct seeded production of 1200 – 1300 kg/ha or 1070 – 1150 lbs. acre.

The 1999-2000 Annual Review of the Canada-Saskatchewan Irrigation Diversification Centre outlines the results of their plot trials on Echinacea angustifolia:

- This study examined the effect of direct seeding with the objective of reducing transplanting costs. Under dryland conditions increasing the seeding rate produced higher root yields. In the irrigation test, seeding rate had no effect on dry root yield. At the densest seeding rate on dryland, the dry root yield was 1880 lbs. per acre, approximately similar to using transplant plugs.
- The impact of seeding density was more significant than row spacings, rate, timing and type of fertilizer.
- If transplants are to be used and in order to avoid greenhouse facilities, transplants were grown in the fall and over-wintered in a straw-covered pit which produced the highest dry root yield compared to other treatments.
- Harvesting Echinacea angustifolia during the third year produced an average 49% higher dry root yield than harvesting the crop in the second year.
- Doubling the plant population by reducing the within row spacing produced 133% higher yield under dryland and 86% higher yield under irrigation.

In summary the overall dry root yield under dryland production was 1773 lb/acre compared to 1629 lb/acre for irrigated production.

The previously noted yields of 1800 lbs per acre is close to the level achieved in plot trials noted above, with a return to producers of $49,500 per acre.

8.4.1.2 St. John's Wort

- Under dryland, the dry herb yields for the various cultivars ranged between 1.9 and 2.6 t/ha during the first year and 1.5 and 2.0 t/ha during the second year

- Under irrigation, the dry herb yields ranged between 1.2 to 1.7 t/ha in the first year and 4.3 and 5.7 t/ha in the second year.

8.4.1.3 Feverfew

The 1999-2000 report highlights that, depending upon spacing and harvest stage, the yield for dryland fresh is between 11.9 lbs./acre – 17.6 lbs./acre with the highest yield when harvested at 100% of flower. Irrigated yield was slightly lower.

8.4.1.4 German Chamomile

During 1999 the dryland produced over three-fold yield increase as compared to irrigated production due to favorable growing conditions. The flowers on dry land depending upon nitrogen, phosphorus, and potassium had yields of between 736 lbs/acre and 851 lbs/acre. Higher plant population produced between 38%- 46% higher herbage yield with closer density of plantings.

8.4.1.5 Milk Thistle

Milk Thistle is a late maturing species with indeterminate growth and flowering habit. Yields were low at between 249 lbs./acre and 347 lbs./acre.

The production costs for Milk Thistle identified in section indicate that at 350 lbs. per acre the return to producers would be $700/ acre, which is significant.

8.4.1.6 Stinging Nettle

- Both the dryland and irrigated tests produced over 30t/ha of fresh herbage.

8.4.2 Saskatchewan Research Processing Capacity

Saskatchewan is very fortunate to have two state of the art processing facilities available for research and custom processing.

8.4.2.1 POS Pilot Plant

POS is a contract research organization that assists developing high value components in industries such as nutraceuticals, functional foods, phytochemicals, cosmetics, edible oils, foods and fine chemicals. POS offers a wide selection of bench-top to pilot-scale research and development capabilities for new product development as well as full custom processing. POS offers expertise in fractionation, extraction, purification and modification. It deals with companies in milling, pressing, solvent and aqueous extraction, deodorizing, component drying or chemical analysis of ingredients and fractions. POS offers the best in quality and GMP control. http://www.pos.ca

The POS Pilot Plant has four major areas:

- Primary Processing – Wide range of dry processing, cleaning, milling, sieving, oilseed crushing and dry separation.
- Flammable Processing – Large and flexible: solvent extraction, solids desolventization, winterization, milling, blending, concentrating and hydrogenation. These processes can be used for extraction of herbals, oilseeds and other biological materials using flammable solvents such as alcohols and hexane.
- Oils Processing – Full range of fats and oils processing: degumming, refining, bleaching, filtering, deodorizing, crystallizing, flaking, packaging and lipid modification.
- Secondary Processing – Devoted to wet processing, includes centrifugation, evaporation, utlrafiltration, drying, filtering, cooling, heating, milling, blending and homogenizing.

The plant has the processing equipment which can handle mini scale testing to pilot scale development and finally to market production.

Milling & Mixing
- Mills – hammer mills, pin, flaking, cracking, disc, Szego, colloid, comminuting, dehullers
- Mixers – Wet and dry mixers including Hobart mixer/dicer, ribbon, twin shell blender, homogenizers

Extraction (solvent and/or aqueous)
- Extractors – Crown, Sozhlet, Heinkel inverting basket centrifuge
- Desolventization – various units for solids and liquid desolventization

Drying and Evaporating
- Dryers – Spray, vacuum tray, fluidized bed, convention, drum, ring, tunnel and freeze
- Evaporators – Flash, thin film, scraped surface, rising film

Separation Equipment
- Chromatography – CPC (centrifugal partitioning chromatograph), pilot scale HPLC
- Filtration – Plate and frame, cartridge, ultrafiltration units
- Air classifiers – Centrifugal and gravity
- Centrifuges – Decanter, desludger, disc, basket, inverting basket, nozzle bowl

Other Equipment
- Homogenizers
- Littleford reactor/dryer
- Oilseed crushing and complete oils processing line
- Pasteurization

Common processes within the secondary processing area include:
- Wet milling, aqueous extraction and fractionation of cereal components

- Preparation of protein concentrates and isolates
- Aqueous extraction and purification of bioactive components from plant materials.

POS cannot do steam distilling and thus is not available for the extraction of aromatic oils, such as mint. The cost of equipment to do 1 tonne/batch is $60,000. POS also cannot do super critical extraction with CO2.

The plant can do alcohol and hexane processing. However, one of the problems with alcohol extraction is that it can reduce shelf life. With a powdered product the shelf life can be extended.

A key piece of equipment at the facility is a Heinkel centrifuge, which can separate ground materials as fine as 2 micron cloth. The centrifuge does not release methanol or hexane.

The cost to install a 100 – 200 litre batch steam distillation operation would cost approximately $1.3 million to purchase the centrifuge, hammermill, product collector system, condensing system, and drying system. The product that is produced is a crude extract. High value single compounds can be extracted from the crude extract with a concentration and fractionation system, ultrafiltration and the centrifugal partitioning chromatograph.

The POS Pilot Plant is in the process of changing their focus from being protein, oils and starches to that of a broader spectrum of services geared to plant materials. POS is also positioning itself to do custom processing. Interested potential users of the service can expect to pay commercial rates for use of the custom processing facility.

8.4.2.2 Innovation Place BioProcessing Centre

The Centre provides small-scale toll processing on a contract basis for the nutraceutical, cosmetic and agri-food industries. The plant has a wide range of wet processing equipment to carry out extraction or fractionation work using aqueous alcohol as a working solvent. The facility operates on a fee for service basis using trained personnel to carry out the processing. The BioProcessing Centre is also available for clients to bring in their own or rental equipment to test different processes or concepts. http://www.innovationplace.com/html/bioprocess.html

The equipment includes:

- Four different styles of centrifuges
- Quadro Engineering Model 194S co-mill
- Quadro Engineering Model Z3 Y-tron homogenizing mill
- Barr-Rosin closed circuit ring dryer
- Barr-Rosin open circuit spray dryer
- Single stage alling film evaporator
- Bubble sieve tray distillation tower
- Process tanks

- Alcohol storage tanks
- Pumps

The plant can process using alcohol from 10% to 95%.

It is able to handle larger volumes per batch than POS Pilot Plant.

8.5 Equipment Design Capability

A major detriment to growth of the industry is the reliance on extensive manual labour for many crops, such as the root crops. The writer believes the technical capability exists in the province for development of equipment, which can greatly enhance the competitiveness of the industry, and may in fact represent export opportunities of new equipment to other regions such as the US.

Saskatchewan has extensive expertise with the University of Saskatchewan, College of Engineering, Agriculture and Bioresource in Saskatoon as well as Prairie Agricultural Machinery Institute (PAMI) in Humboldt, Sask.

A major concern of producers is digging up the roots and being able to get the roots to the surface. Requests for funding have been made by the College of Engineering to develop equipment that can do this, but with approval from the Agriculture Development Fund (ADF) not forthcoming. When U-ploughs are used by producers, manual labour is still required in order to pick up the root. As we predict continued growth in Echinacea in the province, this will be a strategic issue to deal with.

A second major concern of producers is the necessity of handweeding. Applications have been made by the College of Engineering to develop a machine with rotating brushes, which can weed between the plants, but monies have not been forthcoming on this.

For the seed crops, harvesting is still an issue. We are told that the seeds do not mature at the same time, so when the seeds are harvested there is a great deal of inconsistency in maturity of the seeds. The trade-off is shattering if left too long. The presence of immature seeds creates problems in processing and obtaining consistent quality of the oil. As will be pointed out, northern Saskatchewan is believed to have a competitive advantage in the production of essential oils from seed bearing crops, and methods of harvesting seeds to ensure consistent maturity need to be explored. These types of problems were reported with Milk Thistle and Borage.

The flower crops such as Chamomile present great opportunity for the province from a market point of view. A project is underway to develop a prototype to allow harvesting of the flower heads and if the prototype is effective, should present a competitive advantage to the province due to significant reduction in labour costs of chamomile and other flowering crops.

In addition to equipment, more research work is required in post harvest technology:

1. Drying temperatures has been identified as a problem, and producers must be provided with the information on the temperatures to dry the product, which will not lose the active ingredient. Additional research is required in this area.
2. Information is lacking to producers on how long raw material can be kept in storage without losing the active ingredients. Additional research is required in this area.
3. Information is required on the impact of storage temperature on the active ingredients.
4. Buyers criteria are frequently vague and often without scientific support. An example is the efficacy levels between two year and three year Echinacea root. Buyers continue to demand three-year Echinacea root despite no difference in echinacosides.

In summary, providing consistent quality of raw material to the processor and reducing labour costs on farm production are fundamental to success of this industry. Research must be conducted to ensure that equipment prototypes are developed for producers to reduce labour cost and secondly, that the information available to producers on cultural practices is supported by scientific research wherever possible. Saskatchewan has an aggressive farm equipment manufacturing sector exporting throughout North American and offshore who are continually on the look out for new products in order to expand their product line. If the equipment can be developed, and the market shown to be there, the capabilities exist in the province to bring suitable production equipment to market and make it available to Saskatchewan producers.

8.6 Food Centre

The Peterson Building on the University of Saskatchewan campus was refurbished to provide office space for the Food Centre staff and complementary staff from Saskatchewan Agriculture and Food, the Saskatchewan Food Processors Association and the University of Saskatchewan. The construction of the processing centre will provide a federally inspected and European Union inspected processing centre to provide additional product development and interim processing services. In addition the facility will be certified in OCIA, kosher, HACCP and federal certification in fruits, vegetables and seafood.

The Food Centre will be purchasing cryogenic spice milling equipment, which will allow the freezing and shattering of spices for extraction. The only other facility capable of doing this is in Oakville, but is not organic certified. This is believed to be a strategic purchase that will allow vertical development of the industry.

The Food Centre will be capable of doing packaging using nitrogen sparging in foil, which will allow shipment of fresh culinary spices.

8.7 University of Saskatchewan

Dr. Branka Barl is head of the Herb Research Program, which conducts studies on medicinal and aromatic plants as potential specialty crops for Saskatchewan and a source of unique ingredients for phytomedicinal and nutraceutical products. The following write-up is from the web page:
http://www.usask.ca/agriculture/plantsci/herbnspice/project.htm

The program was established in 1994 and is funded by SAF. It provides technical support to the growing herb and spice industry in Saskatchewan through research activities, extension activities and analytical and other services requested by the industry. The special focus of the program is assessment of herb quality in raw and processed form.

8.7.1 Core Activities

Quality assessment of medicinal and nutraceutical crops from seed to harvest and evaluation of value added processing alternatives. This project focuses on developing assays for authentication and quality evaluation of herbs by chemical fingerprinting of herb extracts and quantitative determination of marker compounds specific for each herb. Extensive work has been done on developing chromatographic procedures for the following plant species:

- three commercially important species of Echinacea (E. angustifolia, E. purpurea and E. pallida)
- St. John's Wort (Hypericum perforatum)
- Milk Thistle (Silybum marianum)
- Feverfew (Tanacetum parthenium)
- Valerian (Valeriana officinalis)
- Calendula (Calendula officinalis)
- German Chamomile (Matricaria recutita)
- Goldenseal (Hydrastis canadensis)
- Stinging Nettle (Urtica dioica)
- Calamus (Acorus calamus)
- Senega (Polygala senega)
- Burdock (Arctium lappa)
- a number of essential oil-bearing plants

Research on Sea Buckthorn (Hippophae spp. mainly H. rhamnoides), Licorice (Glycyrrhiza lepidota) and Astragalus (Astragalus membranaceus) is in progress. The project also addresses processing alternatives for herbs as specialty ingredients in phytopharmaceutical and nutraceutical products, food and feed. The Program currently provides analytical services to the herb industry on a cost recovery basis.

8.7.2 Special Projects

- Effect of latitude ("Northern Vigour" potential) in medicinal and aromatic plants
- Herb quality management pre- and post-harvest
- Selection of Echinacea angustifolia lines with desirable nutraceutical profile and consistent high quality
- Research on wild Saskatchewan plants as a source of immunomodulatory activity
- Use of Traditional Chinese Herb Medicines in study of Saskatchewan wild plants for natural anticancer substances
- Studies of Saskatchewan wild plants as potential source of antioxidative activity for food muscle and oil systems.
- Maintenance of Herb Demonstration and Resource Garden

Dr. Branka Barl was the first person that the consultants talked to in order to obtain direction on the crops that can or should be grown in Saskatchewan. These crops were the starting point for our discussions with the other industry members, as described above.

8.8 Plant Biotechnology Institute

Dr. Alison Ferrie of the Plant Biotechnology Institute is involved in a project looking at developing new varieties of plants. Dr. Ferrie advises that use of double haploid technology can reduce the time it will take to bring a new plant to commercialization by 3 – 4 years and avoids GMO technology. As a result, improved varieties could be brought to market in 5 – 6 years. PBI is using micropropogation, which is different than the process patents in place by the University of Guelph and described later in the paper.

8.9 Saskatchewan Herb & Spice Association

A volunteer organization, the consultants found that the association was well respected throughout Canada. In discussions with Connie Kehler, Agriculture Canada, and Conrad Richter, the Consultants were advised that the Saskatchewan Herb & Spice Association may soon become a national organization. The organization is working on several national incentives such as Natural Health Products Directorate, Farm Food Safety linking the industry together nationally. A producer manual has also been developed covering 44 crops.

8.10 Saskatchewan Nutraceutical Network

Kelley Fitzpatrick is the Director of the Saskatchewan Nutraceutical Network. The web page of the SNN is http://www.nutranet.org/subpages/index.htm The following is from their web page. The Saskatchewan Nutraceutical Network's (SNN) role is to lead the

development, and support the growth of, an economically viable nutraceutical, functional food and dermaceutical industry. The SNN was incorporated in April 1997 and in February 1998 received $1M of funding from the Agri-Food Innovation Fund (AFIF). The SNN was the first fully funded and operational Network in Canada and is the only such industry focused organization in the country. The SNN coordinates three Programs: *Research & Development; Market Promotion & Public Awareness and Regulatory & Advocacy.*

Throughout the study the consultants saw a great deal of cooperation between the Saskatchewan Nutraceutical Network and the Saskatchewan Herb and Spice Association. As with the Saskatchewan Herb and Spice Association the work being done by the SNN was recognized throughout Canada. There is no question that Saskatchewan is viewed as a leader in many aspects of the nutraceutical industry.

9 Ontario

R & D Infrastructure includes:

- University of Guelph – agriculture
- University of Toronto
- University of Western Ontario
- Guelph Centre for Functional Foods
- Guelph Food Technology Centre
- Agriculture Canada
- St. Lawrence Technologies Inc.

The majority of work with herbs and spices is reported to be done at Guelph.

The consultants visited Guelph and met with numerous government, research and industry people. They were, without exception, very open and willing to talk about their programs and projects. The consultants did not perceive there to be any sensitivity about Saskatchewan as a competitor, but rather recognized the opportunities and need to work together.

Within the province there was a great deal of work being done on fostering closer working relationships with industry and the university.

The following represent some of the individuals and the organizations that they represent.

9.1 University of Guelph Laboratory Services

The University of Guelph has the Laboratory Services where scientists from different disciplines provide expertise in a number of agri-food related fields. Microbiologists, chemists, food scientists and veterinarians are all working together. Composed of Analytical Services, Regulatory Services, Research Coordination and Animal Health units allow an interdisciplinary staff to approach the different aspects of each field. http://uoguelph.ca/labserv/ Located within the University of Guelph Laboratory Services is the Guelph Centre for Functional Foods doing service and research in functional foods, nutraceuticals and phytochemicals. At this facility, Dr. Chung-Ja C. Jackson is conducting research on isoflavones. Her major work is on soybean, Echinacea and ginseng. Iso-flavonoids are estimated to number 6,000 and are useful for preventing cancer, menopause, prostrate, cardiovascular and osteoporosis. Her work has consisted of testing 60 varieties of soybeans cross matched through a database to the growing locations. For the garlic and ginseng industry work is being done on organosulphur compounds in garlic and analysis of ginsenosides. Dr. Jackson sees potential for ginseng oil to be used in beverages, powder or tincture. Work has not been done comparing products from Ontario compared to Saskatchewan on flavanoids.

Work has been done on the effects of varietal and geographic variations in isoflavone content of soybeans, and differences in allicin content of garlic varieties.

Current projects include the effects of agronomy practices on soy isoflavone content, hypocholesterolemic and anti-cancer properties of soy extracts and soy foods, ginsenoside and nutrient variation amongst ginseng varieties.

9.2 Department of Plant Agriculture

The Department of Plant Agriculture, Biotechnology Division at the University of Guelph is the home of Dr. Praveen Saxena, Ph.D. who is in charge of the program of Development of New Technologies for Plant-Based Medicines: An International Interdisciplinary Initiative.

The Department has developed and patented a process for mass propagation of plants, using plant cells to develop whole plants when provided with adequate nutrients in a controlled environment. Mass propagation is a scientific process that uses small pieces of plant tissues, called explants, that can then be induced to develop either as cells, multiple shoots or somatic embryos. These procedures allow the production of large quantities of genetically similar plants from a limited resource.

The method and its modifications are intended for application to all phytopharmaceutical plants, in particular St. John's Wort, Echinacea, feverfew, garlic and the like. The micropropagation systems provide consistent sterile plant material under controlled conditions for high-quality plant based medicines. It is believed that the micropropagation system will also allow for the improvement of St. John's Wort through selection of genotypes with unusually high levels of pharmaceutically active compounds.

The methodology allows selection of superior individual plants, and assessment of plant/environment interactions. Industrial applications are suitable for pharmaceuticals, and medicinal plants such as Echinacea and St. John's Wort.

The concerns are that many of these active ingredients are medicines and should be raised in a lab in order to exclude the effect of environment on the plant. For example, Ontario is growing herbs on land previously planted to tobacco, which utilized lead based herbicides.

The concern is that we are still missing the basic knowledge on the plants. Work is required to find out what is useful in a plant with testing for efficacy levels.

When asked what it would cost to propogate in a controlled environment, we were told that it would require a case by case analysis but could vary from $0.01/plant to $0.50/plant.

Three priorities of their program will be immune, anti-cancer and neurological.

9.3 University of Guelph Natural Health Products Technology Cluster

Dr. Bill Betger is in charge of this program which is attempting to stimulate organization of this industry through a business cluster. This is being accomplished through web-based information sharing between manufacturers, pharmaceutical companies, retailers, research facilities, and the university concerning a coordinated strategy to develop the Ontario Natural Health Products industry.

9.4 University of Guelph Department of Food Science

During the visit to the University of Guelph we had the pleasure to meet Dr. Rickey Yada who is the Assistant Vice-President (Research) Agri-Food Programs as well as a Professor in the Department of Food Science.

9.5 Summary of Findings of Ontario Interviews

1. Work in Ontario is proceeding at three different levels that we were able to identify:
   - The interviews suggest that interest is being shown from the industries located there including Jamieson, Super-Store, pharmaceuticals and food processors interested in functional foods who are working with the scientific community.
   - The university, research organizations, companies and growers are working together in a virtual organization.
   - Ontario universities, research organizations are working closely with the University of British Columbia and other universities to conduct comprehensive studies to determine the active ingredients within medical herbs.
2. Ontario is described as a one-crop province when it comes to medicinal herbs, the crop being ginseng. Currently, producers cannot sell their Echinacea and their efforts at growing St. John's Wort were unsuccessful due to beetle infestation.
3. The US is creating a non-tariff barrier concerning Ontario's use of a fungicide on their ginseng crop in year 2 of growing. The fungicide is approved in Canada but not in the US.
4. Ontario does not receive a premium for organic production.
5. In discussions with Jan Schooley, Ginseng Expert with the Ministry of Agriculture, Food and Rural Affairs she advises that on the herbal side only Echinacea and St. John Wort have large acreage potential in Ontario. Ginseng acreages are not expected to increase further.
6. Ontario does not have an oil extraction facility. Global Botanticals of Ontario only do cold press extraction for production of tinctures, and concentrated plant liquids. They require a facility similar to the POS Pilot Plant in order to compete in the aroma therapy market.
7. For harvesting of ginseng, a modified potato digger is being used, but the roots are still picked by hand.

8. Ontario cost of labour is higher than that of the US according to Jan Schooley. The Ontario government allows an off-shore program of bringing in workers, primarily from Jamaica.
9. The general view from many of the participants is that Ontario is lacking a co-ordinated research program.
10. Interview participants spoke of the hostility and antagonism between producers and members of the industry.
11. The consensus from a number of industry participants that we spoke to was the need for a concerted effort on value added products in order to play into the new regulatory environment encouraging higher quality products. The focus will be on export.
12. We did not speak to individual growers while in Ontario. However, there seemed to be an attitude among a number of industry participants that the industry needed to play a leadership role in promoting coordination, rather than leaving it all up to the producers.
13. Cost of production information does not exist. The view by many participants is that Ontario producers do not know how to grow these crops well, and development of harvest equipment is non-existent.
14. The view is that many of the large multinationals located in Ontario are not conducting their research in Canada. It is being done in the US.
15. There appeared to be agreement that stress on the plants increase the active ingredients and as such Saskatchewan should have a quality advantage but no inter-provincial comparisons on this were being done in Ontario.
16. Opinions seemed to be divided in Ontario as to the extent to which the pharmaceutical companies will get into medicinal herbs. One view that we heard is that the pharmaceutical companies will be cautious unless they can obtain a patent on the combination of ingredients.
17. The pet food market is viewed as a major opportunity by many in the industry.

9.6 Number of Producers Involved with Medicinal Herbs

The major strength of Ontario is in the spice trade. The amount of production from medicinal herbs other than ginseng is relatively small. It is estimated that some 50 Ontario growers are either already producing or investigating opportunities to enter into medicinal herb production in Ontario. Several of these growers are also contemplating value-added production and possibly direct marketing. Some of the major herbal products being considered (excluding ginseng) include Goldenseal, Echinacea, Feverfew, and Valerian.
http://www.gov.on.ca/OMAFRA/english/research/soi/crops/hort/lowacsoi.html

According to the Ontario Tobacco Board, the tobacco acres continue to decline. Tobacco is primarily grown in the Haldimand-Norfolk county, in an area surrounding Simcoe. They confirmed that the tobacco farmers have the technology that applies to herbs, such as green houses to start plants, transplanting equipment, row crop equipment and drying sheds. The Tobacco Board does not have information as to the extent that producers went into medicinal herbs, other than the report that some producers went into ginseng production. No information was available on other herbs, such as Echinacea.

9.7 Form of Sale

Ontario is selling a great deal of their ginseng to StarWest Botanicals in California. It is being bought in whole form supported by quality certificates. For ginseng, 85% - 90% is being sdd to Hong Kong. The province has a Ginseng Association that sells on behalf of their members. However, it is reported that not all producers belong to the Association, and choose, instead, to sell their own product. A handful of Chinese and Korean buyers visit Ontario annually and meet with growers and negotiate on an individual basis. China has also started to grow Canadian ginseng, which is viewed as complementary to Chinese versions, rather than substitutes.

9.8 Government Programs

Ginseng was encouraged as a crop that could replace tobacco. According to the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA), there were no subsidies offered to producers. However, the increased production that has been noted elsewhere in the report, as reflected through increased exports, has had a negative impact on prices. Buyers are demanding that roots be quintozene-free.

The Ontario Challenge Fund provides matching dollar funding for university research.

9.9 Kinds of Partnerships Being Established To Facilitate Marketing

Ontario & BC Industry Associations

Ginseng growers in British Columbia and Ontario are members of the Associated Ginseng Growers of British Columbia (TAGG) and/or the Ginseng Growers Association of Canada (CGAC), together representing more than 90% of the Canadian ginseng production. Assisted by the Canadian Government, they have formed the Canadian Ginseng Team whose mandate is to develop and implement national ginseng marketing strategies.

The team's mission is to increase the export of Canadian-grown North American ginseng root and value-added products. The goals include:

- Increasing the market share of North American ginseng in traditional markets, while developing new markets,
- Developing the value-added sector and its markets worldwide, and
- Increasing adaptability to provide industry stability and sustainability.[123]

[123] "The Canadian Ginseng Industry: Preparing For The 21st Century," Agriculture and Agri-Food Canada, http://ats.agr.ca/public/htmldocs/e2765.htm

9.10 Key Players in Ontario

9.10.1 Raw Material Suppliers

- Global Botanical Corporation Ltd.
  Newmarket, Ontario
  (705) 733-2117
  www.globalbotanical.com

- Loretta Foods Ltd.
  Mississauga, Ontario
  (905) 678-9250

9.10.2 Brokers

- Buchanan Trading Inc.
  Toronto, Ontario

- MSP Food Sales Co.
  Markham, Ontario
  (905) 940-6514

- Acana Mercantile Inc.
  Belleville, Ontario

- K.I. Litster Ltd.
  Toronto, Ontario

9.10.3 Distributors

- Puresource Inc.
  Guelph, Ontario
  (519) 826-7585
  www.puresource.ca

- Purity Life Health Products
  Action, Ontario
  (519) 853-3511

9.10.4 Manufacturers

- The Herb Works
  Guelph, Ontario
  (519) 824-4280

- McCormick Canada Inc.
  Missisagua, Ontario
  (905) 678-1220

- Poia Naturals
  Brampton, Ontario
  (905) 840-5459

- Griffith Laboratories Ltd.
  Scarborough, Ontario
  (416) 288-3050

- Horton Spice Mills Ltd.
  Uxbridge, Ontario
  (905) 475-6130

- Wiberg Corp.
  Oakville, Ontario
  (905) 825-9900

- KicX Nutrition Inc.
  Guelph, Ontario
  (519) 836-8443

- Essential Solutions
  Wyevale, Ontario
  (705) 322-0550

- Hermann Laue Spice Company
  Uxbridge, Ontario
  (905) 852-5100
  www.helacanada.com

- Swiss Herbal Remedies Ltd.
  Richmond Hill, Ontario
  (905) 886-9500
  www.swissherbal.ca

- C. E. Jamieson & Company Ltd.
  Toronto, Ontario
  (416) 960-0052
  www.jamiesonvitamins.com

- NuSkin (Canadian branch)
  Mississauga, Ontario
  (905) 569-5100

- UFL Foods
  Mississauga, Ontario
  (905) 670-9697

- Kellogg Canada
  Toronto, Ontario
  (416) 675-5232
  www.kelloggs.ca

- Wampole Canada Inc.
  Scarborough, Ontario
  (416) 754-0086
  www.wampole.ca

- Whitehall-Robins Inc.
  Mississauga, Ontario
  (905) 507-7000

- Bristol-Myers Squibb Canada
  Toronto, Ontario
  (888) 422-5247

9.10.5 Seed Suppliers

- Richter's Herbs
  Goodwood, Ontario
  (905) 640-6677
  www.richters.com

9.11 Acreages

The only information that we could obtain was verbal estimates on ginseng acreages from OMAFRA. Currently ginseng acres are estimated at 2,000 – 3,000 acres. Only 2 or 3 companies were involved in the processing of ginseng within the province.

10 British Columbia

10.1 Manufacturers [124]

- There are 45 to 50 manufacturers of nutritional supplements in BC.
- Of theses, 64% offer packaging, 54% do liquid or powder extractions, 36% do encapsulation, 28% do drying, grinding of medicinal plants (indicating that much of these primary activities are done by the grower or raw material supplier).
- 19% of manufacturers work as custom manufacturers in addition to manufacturing their own products.
- 26% of the companies are vertically integrated obtaining their raw materials from land that is owned and/or leased for production by the firm. Of these only 25% obtain all their raw materials from their land, 75% still go to the market.
- 43% of the companies of nutritional supplement are mid size companies with employees ranging from 10-50 employees, 30% are less than 10 employees, and 27% are between 51 and 500 employees.
- Majority - 59% of the nutritional supplement companies - are doing only herbal preparations the remainder are also doing vitamins and minerals.
- Manufacturers will buy various quantities of herbs depending on their requirements.
- The typical manufacturer's purchase criteria includes proper drying, correct identification (species), and a certificate of analysis. As well, manufacturers each have certain standards of color, texture, and aroma that they adhere to.
- Of the material sourced in BC, 56% of companies source directly from British Columbia, 67% stated the source from United States, 41% stated they source globally, and 44% look at other provinces for herb sources.
- Majority of manufacturers (58%) can or sometimes do source the material from the growers (spot market), and many are growing their own crops (31%). The use brokers are only used by 42% of manufacturers and it is felt that this is further declining.
- North American ginseng is the most likely crop sourced from BC followed by Echinacea.
- Manufacturers are distributing their product through their own company sales representative or distributor. Very few have their own retail outlet or use brokers.

10.2 Key Players in B.C.

10.2.1 Brokers

- Golden Bough Herb Co. Ltd
  Vancouver, B.C.

[124] British Columbia Ministry of Agriculture and Food.

(604) 322-0455

- Pharmanutrients Botanical Corporation
  N. Vancouver, B.C.
  (604) 990-1499
  www.pharmanutrients-can.com

10.2.2 Manufacturers

- Albi Imports Ltd.
  Burnaby, B.C.
  (604) 438-1054
  www.albiimports.com

- Alive Health Centre Ltd.
  Vancouver, B.C.
  (604) 921-1928

- Alta Natural Herb and Supplements
  Richmond, B.C.
  (604) 303-1130
  www.alta-natural.com

- Canadian PhytoPharmaceuticals
  Richmond, B.C.
  (604) 303-7782
  www.intergate.bc.ca/business/canphyto

- Celex Laboratories Inc.
  Surrey, B.C.
  (604) 888-1235

- Chai-Na-Ta Corporation
  Langley, B.C.
  (604) 533-8883
  www.chainata.com

- Coast Comfort
  Coquitlam, B.C.
  (604) 552-2731
  www.coast-comfort.ca

- Eclectic Echinacea
  Victoria, B.C.
  (250) 478-2924

- Ferlow Brothers
  Mission, B.C.
  (604) 820-1777
  www.ferlowbrothers.bc.ca

- Flora Manufacturing & Distributing Ltd.
  Burnaby, B.C.
  (604) 436-6000
  www.florahealth.com

- Freshwood Farm
  Armstrong, B.C.
  (250) 546-2449

- Gaia Garden Herbal Dispensory
  Vancouver, B.C.
  (250) 734-4372

- Hannah Ginseng Farms
  Vernon, B.C.
  (250) 558-5086

- Hall Laboratories Ltd.
  Surrey, B.C.
  (604) 597-6113

- Health First Products
  Vancouver, B.C.
  (604) 641-1214

- Herbon Naturals
  Richmond, B.C.
  (604) 214-0705
  www.herbon.com

- Holista Health Corporation
  Coquitlam, B.C.
  (604) 469-4372
  www.holistahealth.com

- Jamp Pharma Corp
  Chilliwack, B.C.
  (604) 795-7988

- Kamploops Ginseng Co. Ltd

Kamloops, B.C.
(250) 374-2387
www.com-star.com/ginseng

- Natural Balance Products Inc.
  Port Alberni, B.C.
  (250) 723-2217
  www.naturalbalanceproducts.com

- Natural Factors Nutritional Products
  Burnaby, B.C.
  (604) 420-4229
  www.naturalfactors.com

- Nutravite Pharmaceuticals Inc.
  Kelowna, B.C.
  (250) 712-0600
  www.nutravite.com

- Pacific Northwest Herb Corp.
  Vancouver, B.C.
  (604) 323-8851

- Rhema Industries Ltd.
  Burnaby, B.C.
  (604) 430-5211
  www.rhemaindustries.com

- SISU Enterprises Co.
  Burnaby, B.C.
  (604) 420-6610
  www.sisuhealth.com

For further information on each company refer to the Buyers List, in Section 18.

10.2.3 Distributors

- Alive Health Centre Ltd.
- Chai-Na-Ta Corporation
- Eclectic Echinacea
- Freshwood Farm
- Hall Laboratories Ltd.
- Hannah Ginseng Farms
- Health First Products
- Holista Health Corporation

- Kamploops Ginseng Co. Ltd
- Pacific Northwest Herb Corp.

Please note that each of the key distributors listed was also a key manufacturer.

10.2.4 Processing Service Providers

- High Pressure Extractions – custom CO2 extraction facilities
- University College of the Cariboo – CO2 extractions

10.2.5 Research Institutions

- The Pacific Agri-Food Research Centre is conducting research in anti-oxidant properties of flavonoids and anthocyanins.

11 Utah

The terms of reference called for an examination of one US state chosen on merit by the consultant. Talking to Maureen Rogers Director of the Herb Growing and Marketing Network indicated that there is little information on production volumes by any state due to lack of interest on behalf of the federal and state governments as well as the universities. She stated that the lack of interest is due to the fact that within the industry there are up to 400 different types of crops all with fairly small volumes.

The reason for choosing the state of Utah is primarily because of its large and highly developed industry for dietary supplements and herbal products. According to Roger Coulombe, Professor of Toxicology at the Utah State University and a leading advocate in the US of the need for greater regulatory controls in the industry, the dietary supplement and medicinal herb industry in Utah is worth $3 billion (US), making it Utah's third largest industry.

There are other important reason for why Utah was chosen: 1) the high presence of manufacturers, 2) the demographics (i.e. religion), 3) the number of herbs being grown in northern Utah, and 4) the region's similar population level to that of Saskatchewan.

11.1 Plants Grown in Utah

Many of the plants grown in Utah are similar to what is grown in Saskatchewan as the list below indicates.

The following annual, biennial and perennial herbs grow successfully in Utah:[125]

Annual
Anise, sweet basil, borage, chervil, coriander, cilantro, Chinese parsley, dill, fennel sweet marjoram, summer savory.

Perennial
Burnet, catnip, chamomile, chives, garlic, chives, comfrey, horehound, English lavender, lemon balm, lovage, peppermint, spearmint, oregano, rosemary, sage, winter savory, French tarragon, thyme.

Biennial
Caraway, parsley

[125] www.utahgreen.org

11.2 Acres and Production

In discussions with the two universities, as well as an extensive on-line search, the Consultants were unable to find any statistics on herb and spice acreage, production, or costs of production. Several growers in Utah were contacted; however, none of them were involved in large-scale production of herb crops. This was confirmed by the purchasing agent of a leading manufacturer in Utah, who stated that: "There are no big growers of herbs in Utah. All our raw materials come from outside the state, and mostly outside the country as well."

11.3 Development of the Industry

The large Mormon population in Utah is interested in a healthy lifestyle and health foods. The result is an openness and demand for functional foods. Companies were initially created to meet this demand. There are reported to be about 200 nutritional companies in Utah. Utah has double the population of Saskatchewan, yet has many times the level of economic activity on natural products.

From discussions with individuals in Utah they attribute the size of the industry to the Mormon's belief in natural products and a willingness to trust and buy from other Mormons.

There are no special business incentives to attract companies.

Some of the companies source their raw materials from the immediate area, for example Young Living Essential Oils, an aromatherapy provider, currently cultivates over 2,000 acres of organic herb production between Idaho and Utah. Their herbs are grown on land uncontaminated by chemical fertilizers, pesticides, fungicides or herbicides. It is irrigated using mountain water and using an advanced mix of enzymes, trace minerals, and organic bio solids.

11.4 Key Players in Utah

11.4.1 Brokers

According to one manufacturer, the only broker in Utah who deals at all with herbs and spices is the Beck Western Brokerage. Beck Western confirmed this, adding, though, that only a small portion of their business involves herbs.

- Beck Western Brokerage
  Salt Lake City, Utah
  (801) 973-6333

11.4.2 Manufacturers

- Natures Way Products
  Springville, Utah
  (801) 489-1500
  www.naturesway.com

- Nature's Sunshine
  Provo, Utah
  (801) 798-4200
  www.naturessunshine.com

- NuSkin (Utah branch)
  Provo, Utah
  (801) 345-1000
  www.nuskin.com

- Twin Labs, Utah Division
  Salt Lake City, Utah
  (801) 363-4060
  www.twinlab.com

- Nutraceutical Corporation
  Park City, Utah
  (435) 658-3503

- Deseret Laboratories
  St. George, Utah
  (435) 628-8786

- USANA Health Sciences
  Salt Lake City, Utah
  (801) 954-7100
  www.usana.com

- Weider Nutrition International
  Salt Lake City, Utah
  (801) 975-5000
  www.weider.com

- Monarch Nutritional Laboratories
  Ogden, Utah
  (801) 392-9111

- Albion Labs
  Clearfield, Utah

(800) 453-2406

- Schiff (Utah branch)
  Salt Lake City, Utah
  (801) 975-5300
  www.schiffvitamins.com

- Sabinsa Corporation (Utah branch)
  Payson, Utah
  (801) 465-8400
  www.sabinsa.com

- Young Living Essentials Oils
  Payson, Utah
  (801) 465-5400

This list of key manufacturers was obtained from Roger Coulombe, through a telephone interview. For more information on these companies, refer to the Buyers List, in Section 18.

11.4.3 Retailers

Most of the manufacturers listed above are also involved in retail as well. Two key companies involved exclusively in retail are:

- The Good Earth
  Midval, Utah
  (801) 562-2209

- Fred Myers
  Salt Lake City, Utah
  (801) 977-2000

See Section 18 for more information on these companies.

12 Migrant Labour

Discussions with representatives from Alberta Agriculture indicated that many growers in Alberta take advantage of the local Human Resources Development Canada (HRDC) foreign worker policy. Under Canadian Immigration, the grower must:

- Pay the cost of the airfare
- Provide living accommodation which is inspected by the labour board (however, the cost of the accommodation comes out of the employee's wages).
- Pay a salary which must be higher than minimum wage.
- Ensure that the employee stays with the designated employer for no longer than 6 months.

The primary advantage of using migrant labour is ***attitude***. The workers are accustomed to working in unfavorable conditions including hard field labour. According to growers who use migrant labour, the productivity per hour is much higher than that of local workers. One potato grower estimated that after the above costs of airfare and accommodation are factored in, the effective cost of hiring a migrant worker is approximately $2 per hour more that the actual wage paid. However, according to this grower, this extra cost is more than made up for by the increase in productivity.

The majority of the migrant workers used in Alberta are of Mexican descent. One faction used by the agricultural sector in Alberta is not migrant labour per se but "Mexican Mennonites." These are children of Canadians who left Canada and settled in Mexico in the 1930's and 1940's but have wanted to return to Canada due to the economic conditions in Mexico. They are Canadian citizens and, as such, follow local labour laws, including the ability to receive only minimum wage rather than the higher wage demanded by Immigration Canada if imported migrants are used. The Mexican Mennonites are deeply religious people and as such will only work 6 days a week. Education means little to this group of people so as a result the children work also.

Primary users of migrant labour in Alberta are growers of fruits and vegetables and potato growers. To secure migrant labour, the grower must deal with a broker.

There have been some problems with importing migrant labour in Alberta. For instance, it is very important that people of the same tribes are recruited, as conflicts have sometimes arisen between different tribes that are chosen to work for the same employer.

The Alberta HRDC office stated that the employer must advertise the position across Canada before migrant labour can be pursued. Furthermore, migrant labour will only be allowed if it does intervene with existing union agreements.

Discussions with HRDC, Saskatoon, revealed that, although Saskatchewan has a foreign worker unit, the province does not have a policy on migrant labour for agricultural purposes. The reason stated was Saskatchewan *does not have the demand* from growers for this service.

Similar polices exist for growers in Ontario, British Columbia, and Manitoba. However, they differ in terms of the peoples they tend to recruit (i.e. Jamaicans or Mexicans).

13 Summary of Medicinal Herbs

13.1 Key Findings

13.1.1 Structure

1. Saskatchewan, the Saskatchewan Herb and Spice Association and the Saskatchewan Nutraceutical Network are recognized as industry leaders across the country.
2. Ontario is encouraging a network within the natural health products and functional foods industry amongst pharmaceutical companies, food companies, brokers and manufacturers, but without extensive involvement of producers. The aim of this program is to encourage co-operation and communication. However, these companies are very secretive and progress appears to have been limited.
3. In the botanical herb market the industry supply chain is shrinking, with companies integrating forward and backward. For example, a prominent health food chain is looking at buying a manufacturer in order to absorb those margins in the sale of their private label product. This is happening on a global basis with European companies taking over American manufacturers in order to obtain their distribution. As a result, brokers and distributors are disappearing and manufacturers are buying raw material suppliers. In some cases, the raw material supplier is contracting with the grower, while, in other cases, the manufacturer is contracting with the grower. Interviews indicate that, in some cases, the manufacturer has its own plantation, which allows it to control supply, quality and inventories. Forward integration is also occurring. For example, a raw material supplier may take on some of the functions of the manufacturer by using outside contract services, thereby providing the manufacturer with a product of greater value than simply a raw material.
4. Volume requirements of the buyers indicate that the growers will have to organize in order to offer consistent supplies of larger volumes of product. Both the raw material suppliers and the manufacturers indicated they are tired of receiving a myriad of calls from small individual growers. By organizing their marketing efforts, producers could share the costs of a hammer mill, the costs of testing, and the marketing costs required to offer a "Saskatchewan presence".
5. There is a lack of comprehensive industry networking throughout Canada. Interviews in Ontario indicate that many processors are not willing to work with other producers. There is widespread reluctance to share information.

13.1.2 Demand

6. Interviews with several Canadian manufacturers indicate that they are having better success in export markets, due to the flat growth in Canada caused in part by regulatory restrictions. These are primarily manufacturers that do not want to deal with the stricter regulations, and are choosing, instead, to target countries such as the Philippines, which still view medicinal herbs as a food.

7. Negative publicity has affected the growth of the market, with lower prices resulting from the stable demand. It is viewed that science is a way to positively influence the media by establishing the dose, efficacy and duration of the herbs. Growth in demand is expected to resume as improved regulations assure consumers of the safety of the product. Imports may decline as regulations are introduced.

13.1.3 Product

8. The concerns that were heard across the country are the same concerns we heard in Saskatchewan. The central issues are concerns over health claims, the impact of regulations, quality, and the need for science to address the concerns of consumers.
9. The major botanical products, such as St. John's Wort, Echinacea and ginseng, are beginning to behave like commodities, as demand has slowed and production has increased. Prices on the commodity herbs have reduced due to increased production worldwide, and show limited prospect for price increases in the short term. However, new uses such as in animal products, plus the potential for government regulations to renew consumer confidence in natural health products, suggest that demand will continue to grow.
10. New herbs are likely to focus on the following growth areas: stress, women's issues, cardiovascular and weight loss.
11. Over the past few years, there is a definite trend to standardize extracts from medicinal herbs in terms of ingredients. Herbal medicines are being purified to certain stringent levels of standardized ingredients. The best selling products are now standardized to a specific marker chemical or active component. As a result, the production of medicinal herbs is approaching pharmaceutical grade quality control, especially in Europe, where, in some countries, they are regulated and sold as medicinals.
12. There is a small faction in the industry that believes any plant with medicinal properties should be grown in a controlled environment. This is because of their view that field production results in unsafe products, due to heavy metal contamination and variability in efficacy levels. They view organic farm production as a pure marketing tool that can only be achieved in a controlled environment. The broader and more widely held industry view is that this is a more expensive method of production, which will have only limited application with certain plants targeted to the pharmaceutical industry.
13. The ingredient market presents opportunities for growth, as herbs such as Echinacea are now being put into drinks, foods, etc. However, companies such as Kellogg's advise that the inability to make health claims in Canada on their ingredients limits their usage of the product. For example, Kellogg's is marketing Vector cereal as a meal replacement rather than a cereal product. Thus, for growth in the ingredient market to occur, Canada's regulatory framework needs to be altered to allow health claims.
14. The use of botanical products as an ingredient in the animal nutrition market is a growth area, which is just beginning to be realized. This market may have a significant impact on traditional herbal products such as Echinacea, which are

currently in excess supply, by increasing the demand for these herbs and, thus, removing the oversupply.

15. A major opportunity in the US is in blends of products, similar to practices used in Europe and Asia. These are composed of a number of different botanicals, the synergism of which can be shown to address targeted health concerns. The ability to do these blends provides the potential to patent the formulation and possibly the process. This advantage, however, will accrue to the manufacturer rather than the producer unless the producer is involved in contract production or in research and development relating to production or manufacturing.
16. The attendance of the Consultants at the Natural Products Expo revealed few Canadian manufacturers with display booths, which suggests a need for increased marketing.
17. The buyer interviews indicated that Canada has a poor reputation for raw material quality, primarily with respect to ginseng and Echinacea.

13.1.4 The Impact of Regulations

18. The new Canadian regulations for natural health products and the industry's attempts to take advantage of the opportunity to sell a credible, quality product will enhance Canada's position as an exporter of finished products. The view is that the North American market will become similar to the European market, with stricter regulations on quality. It is anticipated that buyers in North America will increasingly want to source raw materials from reputable growers, rather than markets that have been known to provide herbs with contamination from animals and insects, or other sources (e.g. raw materials from China and India have this reputation). Very little cleaning is done to the product prior to shipment to North America markets, making it costly for the importer to meet the demands of an increasingly strict self-regulatory environment. The assumption is that the GMP for natural health products will be more stringent than current food regulations.

13.1.5 Change Drivers

19. There will be an increased effort by Health Canada and others to identify, through research, the health benefits of various herbs, and the active ingredients as measured through active or biomarker constituent levels. These will be measured based on environmental, regional and agronomic effects. A Canadian consortium, representing regional interests, is attempting to be formed, in order to identify the health benefits of various herbs and to measure their active or biomarker constituent levels. Currently, Saskatchewan does not have a representative on the Canadian Network for Herbal Medicine Research.

13.1.6 Production

20. Securing a contract with a raw material supplier or manufacturer does not necessarily guarantee a sale. Industry interviews indicate buyers are very uncompromising when it comes to quality specifications and standards. Producers need to be able to find ways to reduce the risk of not meeting quality specifications by gaining the ability to blend or up-grade.
21. There is a lack of accurate data on production and trade of herbal products and herbal raw materials.
22. Although improvements are being made, there is still not adequate agronomic information for Saskatchewan on a range of herb crops, such as French Tarragon, Fennel, Oregano, Ginseng, Astragalus, Horseradish, Lovage, Black Cohosh, Goldenseal, Tribulus, and Red Clover.
23. There is a great deal of uncertainty with regards to returns, creating a "catch 22" scenario. The market is reluctant to accept the product before supply and quality can be guaranteed; however, growers are reluctant to grow the crop before the market commits to price and quantity.
24. Saskatchewan appears to be the only province working on improving agronomic practices.
25. Both Saskatchewan and Ontario are looking at most suitable varieties and varietal development programs.

13.1.7 Research

26. There is a widespread view that science is needed to lead the marketing effort. As Dr. Bruce Holub, Professor at the Department of Human Biology and Nutritional Sciences at the University of Guelph, stated, "efficacy, duration and dose have to be identified for each medicinal herb." This has been done by a producer group, Ocean Spray, with cranberries, who have assisted in funding research on the effects of their products on medicinal conditions such as prostrate gland reduction in men and urinary tract infection in women. The result of this research was positive press coverage, which has created brand equity for both cranberries and Ocean Spray.

13.2 Sources of Competitive Advantage

1. With our extensive scientific community we have the technology to identify and maximize, through plant breeding, agronomy, production and manufacturing, the active ingredients and synergistic effects of various herbs. This should allow Saskatchewan to create a brand image of quality raw materials.
2. The Saskatchewan Herb and Spice Association is viewed as the leader in the Canadian herb and spice industry. It is believed that Saskatchewan may possibly become the location for a national association for herbs and spices. This will have a significant impact on the profile of Saskatchewan products, producers and companies. A similar situation is occurring with the Saskatchewan Nutraceutical

Network, as they are the lead organization currently developing a Canadian network for nutraceuticals and functional foods. Just as early organization strengthened the role and importance of the Saskatchewan Pulse Growers Association, we believe it to be possible that the same can be done with these provincial associations.

3. Saskatchewan already has the Saskatchewan Nutraceutical Network, with good working relationships between them and the Saskatchewan Herb and Spice Association. Both are viewed as two separate organizations, providing a unique service to those in the supply chain. The fact that Saskatchewan has both strengthens its infrastructure, networking, contacts and potential ability to develop its processors and attract other processors.
4. Organizations such as PAMI, the College of Engineering, Agriculture and Bio-resource, and an extensive presence of world scale farm implement manufacturers, suggests that the issues of required mechanization can be addressed, with possible positive spin-off effects to our implement manufacturing sector.
5. We have the potential to add more value in Saskatchewan through further value-added activities and further assurance of supply, while being a supplier to the food companies, natural food stores and herbal manufacturers.
6. Saskatchewan has a long history of acting in an organized manner when it can be shown that there is financial benefit to individuals by doing so.
7. Further processing of extracts creates a product of very high value and, thus, reduces the impact of high freight costs caused by Saskatchewan's distance from some markets.
8. Although sales are increasing dramatically through the mass market, sales of medicinal herbs are still prominent through other channels, such as the internet, health food stores, practitioners, mail orders, etc.

13.3 Sources of Competitive Disadvantage

1. Our processors are generally small companies with limited ability to forward integrate and to market effectively.
2. Agronomic cultural practices, which would indicate the crops that can be economically produced in Saskatchewan, have not yet been completed.
3. There are crops that could potentially be grown in Saskatchewan, and a significant market share could be captured (for example, chamomile). However, Saskatchewan does not yet have the technology to become competitive by overcoming the labor requirements.
4. There is a lack of knowledge by US companies of Canadian sources of supply.

13.4 Supply Side and Market Drivers

1. Lifestyle,
2. The aging baby boom generation,
3. The trend of people taking personal responsibility for their own health,
4. Demand for high quality products supported by science and efficacy of claims,
5. The entry of the retail chains, which is causing shrinking margins for the manufacturers,
6. The insistence of the retailers on assured quality and safe manufacturing practices, and,
7. The growing market for organic products in North America and Europe.

13.5 Opportunities

1. With access to production, Saskatchewan has the capability to produce herbal extracts from crude botanicals.
2. With access to POS and Bio Processing, both with the mandate to do toll processing, Saskatchewan has the capability to produce concentrated dry extracts.
3. With the creation of packaging capability in Moose Jaw, through Nutravim, Saskatchewan has the capacity to produce encapsulated herbal products.
4. These opportunities are dependent on quality assurance systems being in place, clear recognition of what we can and cannot produce, production protocols and efficiencies, commercial scale production, research and development, plant breeding efforts, and management and marketing skills to show producers how to bring their product from field to market.

13.6 Recommendations

1. More than anything, the province needs a vision as to what the herb and spice industry in Saskatchewan could be in five years. Success stories need to be highlighted, as well as the overall progress made in the last five years. This growing vision, coupled with the fact that Saskatchewan already has key players in place, would encourage value-added processors to establish themselves in the province.
2. It is important that Saskatchewan know what is happening in other parts of the industry. It is critical that the Saskatchewan research industry be represented on a network research consortium, in order to have input. An assessment needs to be made as to whether Saskatchewan should seek to join the proposed Canadian Network for Herbal Medicine Research, which would be coordinated out of the University of British Columbia, or organize its own consortium.
3. Funding support of the Saskatchewan Herb and Spice Association is recommended so that a full-time Executive Director could be hired and paid. The grower base will only strengthen with a strong association providing

agronomic information training and, in conjunction with the SNN, market information and market leads.

4. Funding dollars need to be made available to identify cultivars suitable to our climate and growing seasons, which are required by the industry. As well, funding needs to be provided to develop high quality germplasm through a combination of tissue culture/microspore techniques for cell identification (R&D by the Plant Biotechnology Institute) and plant breeding.
5. The herb sector requires an Industry Liaison Officer to work one-on-one with members concerning agronomic, pricing, and market development.
6. Dr. Holub suggests that blends of herbs ("multi-factorial herbs") is a desired direction supported by small medical trials in order to support brand names. In his view, the traditional approach of one active ingredient/one test is too limiting and does not deal with the synergy of ingredients. Provincial government funding should be made available to enable this to occur.
7. It is recommended that grower groups be assisted in organizing themselves, in order to supply the industry more effectively.
8. Research funds need to be provided for both primary production and value-added research, in order to concentrate and fractionate plant products as novel ingredients for both foods and natural health products.
9. It is recommended that SAF work with Saskatchewan Herb and Spice Growers in improving regulations for producers/cottage processors. As well, SAF needs to help facilitate Farm Food Safety during the transition.
10. It is recommended that SAF support the Saskatchewan Herb and Spice Association and the SNN, as both organizations work synergistically to move the herb and spice industry forward.
11. Recognizing the high risk involved, producers must be encouraged to grow several types of medicinal plants, in addition to one or two large acreage crops. Producers must also test the market and growing practices for several medicinal plants.
12. This will be an important industry, and to enhance its growth the provincial government must find ways of measuring the industry's leading indicators. This requires the development of statistical measures that are meaningful to the industry. The total number of acres planted, or production costs alone are inadequate indicators.
13. As the regulations change and become more stringent, small producers, unwilling to expand to meet these standards, will fall out of the industry. This should not be considered a sign of the Saskatchewan industry's failure; rather, it must be recognized as a cost of becoming a significant player in the industry.
14. This industry should be identified as one with high potential, and worthy of government equity investment.
15. The visit to Ontario yielded information that could not have been obtained elsewhere. Similarly, the visit to the Anaheim trade show on Natural Products also provided contacts and information not otherwise available. The SNN has extensive contacts in the US and Europe, but has been limited in disseminating industry and contact information due to lack of labor and financial resources. It is recommended that follow-up work be conducted to this study by similar visits to California, Utah, British Columbia, and Purdue University, and that funding be

provided for the SNN to create a position to accomplish this work on a regular basis.

14 Summary of Essential Oils

14.1 Key Findings

14.1.1 Structure

1. Essential oils are sold in the food, flavor and cosmetic markets. The processed oil is usually sold to a flavor house, either directly or through a broker, with the flavor house having the capability to blend hundreds of oils for food companies and cosmetic companies. The flavor houses usually do not have their own processing facilities to extract the oil; rather, they buy the extracted oil directly from processors or through brokers.

14.1.2 Market Requirements

2. Each customer of the flavor house will have a different and proprietary formulae for use in their end products. For example, one Saskatchewan processor sells four different formulas of Cilantro oil, depending upon the requirements of the end user.
3. For a supplier to successfully compete in this market, it must be reliable, with adequate and available product on a just-in-time (JIT) basis and with products demanded by the market.
4. The industry has excellent market potential, as shown by one Saskatchewan processor (Maple Ridge Farms), which exports caraway oil to Europe. This is the first time that this has been done from North America, thereby reversing the usual flow of the product. However, marketing to the large flavor houses is very demanding.
5. The buyers have reduced lead-times on ordering, and, therefore, a small processor needs to be able to store the product in the right conditions and have sufficient supplies on hand to ship on a JIT basis.

14.1.3 Processing

6. Using steam distillation results in a much higher level of oil extraction than other alternative methods, such as vats. The steam bursts the oil capillaries within the seed, and vaporizes the oil at the same time that the steam is vaporized. The mix of oil and steam are condensed with the lighter oil separated from the water. In discussions with a Saskatchewan processor the use of a continuous flow extractor results in the recovery of a higher percentage of oil than alternative approaches. Since the oil content in many of these raw materials is less than 1%, oil recovery is key. POS and Bio Processing do not have steam distillation facilities, which limits the opportunity for toll processing.

7. The development of a continuous flow extractor allows processing to take place year round, 7 days a week, 24 hours a day, as opposed to the use of vats that can only be used outside during the warmer weather. Maple Ridge Farms has that capability.
8. Commercial processing of essential oils in Saskatchewan is being done on caraway, coriander (cilantro oil), dill and hemp, with development work being undertaken on mustard oil, anise and others. Seed oils such as borage are being processed in Saskatoon. Spearmint is being processed in the Outlook area by Phoenix Aromas.
9. The capital costs of individual producers having the capability of steam distillation of essential oils are high, varying between $5,000 – $10,000 for a small kettle, to $1.0 - $2.0 million USD for a plant capable of processing 50 tonnes per day. In addition, the knowledge required to do this processing is high, and the cost of acquiring the technology for commercial scale production provides a significant barrier to entry to most producers.

14.2 Sources of Competitive Advantage

1. Saskatchewan has shown that it can grow coriander and caraway, both sources of essential oils.
2. Experience with other crops, such as canola, have shown that planting in a more northerly climate, such as Prince Albert and north, will result in a higher oil content than the southern regions of the province. In the canola industry, the oil contents of canola grown around Nipawin are approximately 2% higher than that grown around Saskatoon. This appears to be the result of the cooler nights, which places a greater stress on the plant, resulting in higher oil content. From anecdotal comments, it appears that other oil-bearing plants, such as caraway, grown in northern Saskatchewan also yield higher oil content.
3. The plant breeding expertise, pilot scale processing facilities and relationships exist to improve plant breeding for those plants that are viewed as having long term potential for Saskatchewan.
4. Processing needs to be close to the point of production, as the essential oil is such a very small part of the total biomass and storage impacts quality.
5. Saskatchewan has ample acreage to utilize the biomass for fertilizer or feed, following extraction.
6. With POS and Bio Processing, the province has some capability for growers to produce crops with essential oils, have it custom processed and concentrate their resources on marketing. To really exploit this opportunity would require commercial level steam distillation extraction and super-critical CO2 capability.
7. Some production information exists that indicates that Saskatchewan producers can grow a number of these crops economically.

14.3 Sources of Competitive Disadvantage

1. The market is not large enough for a significant increase in the number of processors.
2. It is difficult to make initial sales to break into the flavour houses, which have long standing relationships with traditional suppliers, unless it can be shown we have a differentiated product or cost advantage.
3. The number of processors with their own processing facilities are very limited, and likely to remain so due to the high cost of equipment.
4. POS Pilot plant and the Bio Processing plant do not have super-critical CO2 extraction, which would allow the production of very high, minor components.
5. The small size and high cost of the POS facility is a disadvantage; however, if high value products are concentrated on, the facility may offer some opportunity.
6. China subsidizes its state owned enterprises and producers, which can place North American companies at a competitive disadvantage even within their own country.
7. Small producers have to contend with virtual price control by large processing companies on the US East Coast.
8. The large companies can practice predatory pricing, that is, selling for long periods of time below their costs of production in order to drive out small processors. It is, therefore, advisable for a small producer to have the cash flow to be able to operate 12 months without selling.

14.4 Supply Side and Market Drivers

1. The demand for essential oils is increasing, and the major reason is the growing popularity of aromatherapy.
2. Consumer preferences are emerging for organically produced ingredients in flavour and fragrance products
3. In the US food industry, companies advertising "natural flavors" on their label must source essential oils.
4. The industry demands quality, though adulteration is hard to detect.

14.5 Opportunities

1. The technology developed by Martin Gareau, of Maple Ridge Farms in Prince Albert, Sask., suggests that he has obtained a significant cost advantage on processing for essential oils. To expand his operation requires equity investment, which should be encouraged by the applicable provincial government venture capital providers.
2. The Bio Processing facility with its alcohol distillation process is not really suitable for extraction of essential oils as this is better achieved with a steam distillation unit. The alcohol distillation process is more suitable with other plant extracts.

3. A strategic option is to treat the essential oil as a by-product of an existing herb crop being used for other purposes, such as high quality feed from high oil crops such as coriander. With an existing animal industry close by, this presents economic advantages for certain crops.

14.6 Recommendations

Saskatchewan is viewed by a number of individuals in the trade as having the potential for a competitive advantage in the growing of essential oil crops, such as caraway and coriander. Secondly, there is a limited opportunity for Saskatchewan processors to buy the product and extract the oil. With recoveries of some of these oils at less than 1%, the maximum economic advantage is where these crops are processed at production. However, the cost and expertise required to process makes this unrealistic for most producers unless they can access toll processing.

1. Breeding for high oil content and adaptation to Saskatchewan climate is required. For most spice crops grown in Saskatchewan the breeding for the production of essential oils is in its infancy. There is believed to be considerable opportunity for genetic improvement to the crops in order to increase the amount of essential oils that the plant contains. The work being done by the Plant Biotechnology Institute and the University of Saskatchewan needs to be encouraged and, where necessary, financially supported. It must be recognized that research done today may not be commercially available for 6 – 7 years.
2. The SIDC has done considerable work on assessing the suitability of various herbs and spices for Saskatchewan. However, they face the problem of limited funding. Increased investment is required in addressing crop cultural requirements on a range of soil types and in different parts of the province for those crops for which it is viewed that Saskatchewan can be competitive. This could include planting and growing schedules.
3. Detailed development work needs to be conducted concerning the impact of soil fertility and fertilizer use on oil quantity and quality.
4. Techniques in seed selection need to be applied, to find those varieties best suited for Saskatchewan.
5. Research on harvest timing and methods need to be assessed. For example, research from Germany highlighted that the timing of harvest can affect the concentration of essential oils in chamomile.
6. Detailed market research on each individual crop must be conducted, including provision of samples to potential clients, competitor analysis of competing products, review of the literature on extraction results, and costs of steam distillation versus other forms of extraction.
7. Carbon dioxide extraction has been highlighted as a desirable new technology because it is environmentally friendly, there are no undesirable solvent residues in the final product, and the end products are often different and of better quality. For these reasons, it should be examined for viability in Saskatchewan. However, this technology is very expensive.

15 Summary of Spices and Dried Culinary Herbs

15.1 Key Findings

1. Global spice prices are volatile, due to fluctuation of supply, not changes in demand.
2. The global market is moderately expanding by about 3-4% per year. Consumption in North America is also increasing. Spice consumption in the US is currently 3.6 pounds per capita, with hot spices representing the most important segment of the market, at 39% of US consumption.
3. Spices are viewed as being demand inelastic, as companies do not significantly increase their quantity demanded when prices fall.
4. Overall, spices behave much like a commodity, as there is relatively little product differentiation for a given spice, and there is the tendency for changes in production to cause swings in prices.
5. Canada is the US's largest export market for spices, supplying 15% of the US consumption of spices. However, this consists almost entirely of mustard seed.
6. Emerging spices in North America are centred round the growth in ethnic foods, particularly Asian and Hispanic.
7. Canada's supply of spices to the US is limited, with Canada being a net exporter of only coriander, caraway, and mustard seed.
8. Of the total exports in 2000, Saskatchewan supplied 29% of the total Canadian exports.
9. According to the Canadian trade statistics, Saskatchewan supplied 100% of the Canadian Anise exports, 58% of the coriander exports and 65% of the caraway exports.
10. Disease continues to be a major threat to the Saskatchewan spice industry affecting both caraway and coriander.
11. Producer returns are positive for the spice crops Saskatchewan exports.

15.2 Sources of Competitive Advantage

1. Saskatchewan has made progress in varietal seed selection for coriander, and is now reported to have a reputable seed source.
2. The spice crops can utilize existing mechanization and require little capital investment by producers.
3. Cryogenic processing is expected to be available at the Food Centre in Saskatoon, which, subject to volume and size will enhance processing in Western Canada.

15.3 Sources of Competitive Disadvantage

1. Brokers indicated that producers in Saskatchewan are having quality problems with Anise.

2. Disease is common in Saskatchewan, especially in areas with cooler and longer wet seasons.
3. Coriander can be grown worldwide, in widely different locations with very different climates.

15.4 Supply Side and Market Drivers

1. The baby boomers desire for health foods and spicier foods is growing as they age.
2. Ethnic diversity in the population is promoting different seasonings.
3. Growth in convenience foods is leading to increased demand for herbs and spices.

15.5 Opportunities

1. Coriander is a common spice used in Indian foods, which has growth potential.
2. Breeding efforts need to continue to address the disease problem. Some progress is already being made for coriander.
3. Spice production offers an alternative to other traditional crop production.

15.6 Recommendations

1. For production, the focus should be on improving returns, through addressing disease concerns.
2. Canada is a large net importer of spices. It is possible that we can reduce reliance on international markets through import replacement of certain spices.

16 Summary of Fresh Culinary Herbs

16.1 Key Findings

1. Emerging fresh herbs in North America are centred round the growth in ethnic foods, particularly Asian and Hispanic.
2. The industry in Saskatchewan is generally viewed to be small-scale, cottage type, intensive, and of high value, catering to small and niche markets.
3. The crops tend to be labour intensive.
4. Regular supply is required, suggesting that a coordinated effort to supply fresh herbs year round will be necessary in order to maintain markets.

16.2 Sources of Competitive Advantage

1. The potential for indoor production exists, which will allow the control of heat, light and weeds due to hydroponic production.
2. Closeness to several larger urban centers, such as Saskatoon, Regina, Winnipeg, Calgary and Edmonton, gives Saskatchewan a competitive advantage in servicing the high-end restaurant trade of these cities.

16.3 Sources of Competitive Disadvantage

1. Due to the fact that these crops are labour intensive, the growth of the industry has been slowed.
2. Due to the nature of Saskatchewan's climate, regular supply of fresh herbs year round is difficult.
3. Expansion into other provincial markets is limited, due to the difficulty of maintaining the quality of fresh produce while transporting it to other provincial markets. Value-added products, such as dried herbs, would not have this problem.

16.4 Supply Side and Market Drivers

1. Producing indoors assures organic production and consistency of size, taste and quality. The Consultants spoke to an operation in Toronto that is producing organic lettuce indoors, with production many times that of a green house as well as lower per unit costs.
2. Continuity of supply on a twelve-month basis is required, and we heard of only one producer who was investing in the infrastructure necessary to accomplish this.

16.5 Opportunities

1. There may be opportunities to sell locally produced fresh herbs to retail chains, such as Federated Co-op, Safeway, etc., if a year-round supply can be assured.
2. There is believed to be an opportunity to supply herbs to local food businesses for use in their operations, e.g. bakeries, high-end restaurants.

16.6 Recommendations

Fresh bulk herbs have the potential to offer attractive profit margins but are restricted to seasonal production unless a greenhouse is used. The size of the local market is limited and superior packaging is needed. Expanded market opportunities are related to use in other manufactured products, such as pesto.

17 Summary of Key Recommendations

The body of the report describes the key findings and recommendations related to medicinal herbs, essential oils, spices, fresh and dried culinary herbs. This section will bring together specific recommendations which are common to all four areas.

17.1 Recommendation One: The Need for a Vision

The province needs to spell out a vision as to what they view this industry could be within the next five years. In the view of the author this industry is similar to other fledgling industries which are now an essential part of the agriculture make-up of the province including canola and pulse crops. There has been enough work done on the agronomics to show that Saskatchewan can be competitive in a number of crops which can be enhanced with research. There has also been enough work done to show that the market is in the early growth stage with significant increase in demand yet to occur.

Related to the above must be the recognition and understanding that the producers and manufacturers who are currently involved are the innovators and early adopters. As they become more confident with production and marketing the industry will grow as the late adopters and the majority follow.

Vision also implies long term commitment. Currently the industry is stalled with minimal growth and declining prices. However, the research indicates increased uses of medicinal herbs in animal products and the introduction of new regulations will assure greater consumer confidence, all of which will be positive on demand and prices.

The KPMG study indicated that in 1999 the Saskatchewan nutraceutical and functional food industry of which natural health products is a part had sales of $50.0 million. With annual growth rates of 8% - 15% there is the potential that the current industry will be valued at $100.0 million by 2004. As disease issues are addressed, agronomic practices improved and appropriate cultivars identified there is the potential for the industry to grow to $200 million in 10 years time.

17.2 Recommendation Two: Funding for Market Specialists

The province needs to provide the tools for the innovators and early adopters to succeed. This is a very complex industry, with a great deal of difficulty for entrepreneurs to obtain information on market trends, prices and quality specifications. It is recommended that a provincial market analyst position be created within the provincial government dedicated to this sector as well as funding for an industry specialist, employed by the SNN to work with the Saskatchewan Herb & Spice Association and SNN members in order to assist in the development of new marketing initiatives particular to the SNN membership.

17.3 Recommendation Three: The need for Saskatchewan to play a greater role in national research consortiums in medicinal herbs.

The change in regulations will result in increased research being done by universities and research organizations on the health benefits and active ingredients of various herbs. There is at least one effort being made to form such a consortium (Canadian Network for Herbal Medicine Research at UBC) and at date of writing Saskatchewan was not a participant. The potential for Saskatchewan to identify and participate in major developments in the industry would be enhanced by participating in such a consortium or taking a major leadership role in the formation of such a national consortium. Saskatchewan has the stature to play a leading role at the national level.

17.4 Recommendation Four: Provide funding to hire a full-time Executive Director of the Saskatchewan Herb & Spice Association

The national scene identifies the Saskatchewan Herb and Spice Association as playing a major leadership role at a national level within the herb and spice industry as identified by a number of industry participants at different levels and across the country. This reflects the fact that the issues that Saskatchewan producers are experiencing are not confined to Saskatchewan but a national concern. To date, the work done by the Saskatchewan Herb and Spice Association has been done with volunteers, which is admirable but not sustainable. To sustain and build on these earlier efforts will require a full time paid director, which, for the initial few years, will need to be funded by the government. Saskatchewan's image could be enhanced by so doing.

17.5 Recommendation Five: Funding for research for improved varieties

Funding for research to identify cultivars suitable to our climate and growing seasons are required by the industry. As well, funding needs to be provided to develop high quality germplasm through a combination of tissue culture/microspore techniques for cell identification (R&D by the Plant Biotechnology Institute) and plant breeding. This will create a competitive advantage for Saskatchewan producers as the market grows and becomes differentiated on quality.

17.6 Recommendation Six: Funding for Value Added Research

Opportunities exist for novel ingredients in both foods and natural health products. Funding needs to be available for investigating the concentration and fractionation of plant products by entrepreneurs in order to allow the manufacturing sector of this industry to focus on unique, novel food ingredients for use by major companies. This is a boom and bust industry which will be typified by periods of over-supply. A province with a processing sector has the potential to handle the problem of over-supply. Lower prices will create new uses, which are met by the products closest to the manufacturer.

17.7 Recommendation Seven: Funding for Additional Competitive Analysis

The visit to Ontario yielded information that could not be obtained elsewhere. It is proposed that market research monies be made available to the SNN or the Saskatchewan Herb & Spice industry to fund further evaluation of competitive efforts in California, Utah, British Columbia, and Europe.

17.8 Recommendation Eight: Funding for Commercial Steam Distillation

The POS Pilot Plant has hexane and alcohol distillation equipment. The Bio Processing facility has alcohol distillation equipment with a recovery system. The province does not have a steam distillation facility which could be used for toll extraction of medicinal herbs. We understand used equipment is available in western Canada which should be investigated for feasibility. The presence of such equipment is complementary to hexane and alcohol (methanol) extraction and will allow Saskatchewan producers to do further value added processing such as in the area of extracts. The feasibility analysis needs to explore an appropriate location, but with sufficient steam, the Bio Processing facility would appear to be a suitable site.

18 Buyers List

The information listed in this section was not derived from any single source; rather, the information is a culmination of multiple interviews and secondary sources.

18.1 Brokers

Market Segment	Company	Contact	Address	City	State/Province	Postalcode	Phone #	Fax #	Website/ E-mail
culinary herbs	Demeter Agro Ltd.		1410 Mayor Magrath Dr., Box 1891	Lethbridge	AB	T1J 3Y5	(403) 329-4111		
culinary herbs	MSP Food Sales Co.	Yohya Piracha	6 - 25 Royal Crest Ct.	Markham	ON	L3R 9X4	(905) 940-6514	(905) 940-5294	
culinary herbs	Shah Trading Company Ltd.	Baba	3451 McNicoll Ave	Scarborough	ON	M1V 2V3	(416) 292-6927	(416) 292-7932	
culinary herbs	Acana Mercantile Inc.	Frank Dobson	208 Dundas Street E., Ste. 204	Belleville	ON	K8N 1C4			
culinary herbs	K.I. Litster Ltd.	Mark Crawford	251 Bartley Drive	Toronto	ON	M4A 2N7			
essential oils	Leeward Resources, Inc.	Billy Brown	66 Floral Ave.	New Providence	NJ	07974	(410) 837-9003		
essential oils	David Cookson & Co., Inc.	David Cookson	170 Kinnelon Road	Kinnelon	NJ	07405-2347	(973) 283-1500	(973) 283-1860	

Market Segment	Company	Contact	Address	City	State/Province	Postalcode	Phone #	Fax #	Website/ E-mail
medicinal and culinary herbs	GCI Nutrients	Christian Hoffert	1501 Adrian Rd	Burlingame	CA	94010	(650) 697-4700	(650) 697-6300	www.gcinutrients.com
medicinal herbs	Frontier Natural Products Co-Op	Barb Letchworth, ex. 1223	3021 78th St., Box 299	Norway	IA	52318	(319) 227-7996	(319) 227-7966	barb.letchworth@frontierherb.com
medicinal herbs	Reece Associates	Peter Reese					(516) 285-0861		
medicinal herbs	Wilke Resources Inc.	jrf@wilkeresources.com	14321 W. 96th Terrace	Lenexa	KS	66215	(913) 438-5544	(913) 438 5554	
medicinal herbs	Halford-Lewis Ltd.	Herb Lewis	#606-465 St. Jean	Montreal	QB	H2Y 2R6			
medicinal herbs	Buchanan Trading Inc.	B. Buchanan	4174 Dundas St. West	Toronto	ON	M8X 1X3	(would not provide)		
medicinal herbs	Master Formulae	Barbara Johnston	1864 Road	Kelowna	BC	V1Z 3E5	(250) 769-3970	(250) 769-3819	
medicinal herbs	Meridien Trading	David Ack		Boulder	CO		(303) 442-8683		
medicinal herbs	Altut Inc.	Allen Polon	6450 3rd Palm Point	St. Pete Beach	FL	33706-2124	(727) 367-4902	(727) 367-5738	
medicinal herbs, culinary herbs	Northwest Botanicals	Richard Miller	493 Coutaut lane	Grant's Pass	OR	97527-9641	(541) 476-5588	(541) 476-1823	
medicinal herbs	Pharmanutrients Botanical Corp.	Stephan Morin, Wayne Hache	#300 - 18 Gostick Place	N. Vancouver	BC	V7M 3G3	(604) 990-1499	(604) 990-1377	www.pharmanutrients-can.com
medicinal herbs	Castlegaurd health services	Paul Renoulle	19 Isabel Drive, RR#4	Bantford	ON	N3T 5L7	(519) 752-6194	(519) 752-0013	castleg@execulink.com

									.com

18.2 Distributors

Market Segment	Company	Contact	Address	City	State/Province	Postalcode	Phone #	Fax #	Website/ E-mail
culinary and medicinal herbs	San Francisco Herb and Natural Food Co.	Barry Malzer, barry@herbspicetea.com	47444 Kato Road	Fremont	CA	94538	(510) 770-1215	(510) 770-9021	www.herbspicetea.com
culinary and medicinal herbs	Whole Herb Co.	george@wholeherbcompany.com	19800 8th St. E.	S. Plainfield	NJ	07080	(707) 935-1077	(707) 9353447	www.wholeherbcompany.com
culinary and medicinal herbs	Watson Industries Inc.	watsonii@earthlink.net	883 S. Azusa Ave.	City of Industry	CA	91748	(626) 964-1835	(626) 964-3615	
culinary herbs	MacaAdvantage	Louis Silbermen	8260 East Gelding Dr., Suite #103	Scottsdale	AZ	85260	(877) 846-2225		louis@healthventures.com
culinary herbs	Stauber Performance Ingredients Inc.	dpadilla@stauberusa.com	4120 N. Palm St.	Fullerton	CA	92835	(714) 441-3900	(714) 441-3909	www.stauberusa.com
culinary herbs	Wild Flavors Inc.	Bee Davies	7315 pacific circle	Mississauga	ON	L5T 1V1	(905) 670-1108	(905) 670-0076	
culinary herbs	Indigo Marketing	Debbi Hollette	291 East 2nd Drive	Vancouver	BC	V5T 1B8	(604) 876-2880	(604) 876-1060	www.kicxnutrition.com
culinary herbs	Schouten USA	c.jones@schoutenusa.com	3300 Edinborough Way	Minneapolis	MN	55435	(952) 920-7700	(952) 920-7704	
culinary herbs	Rochem International Inc.		305 Northern Blvd.	Great Neck	NY	11021	(516) 829-4060	(516) 829-4059	www.rochemintl.com
culinary herbs	Avena Botanicals	Deborah Soule	219 Mill St.	Walpole	ME	04865	(207) 594-0694		

Market Segment	Company	Contact	Address	City	State/Province	Postalcode	Phone #	Fax #	Website/ E-mail
culinary herbs	Ria International	ss@riausa.com	9 Whippany Rd., Ste. C3	Whippany	NJ	07981	(973) 581-1282	(973) 581-1283	www.riausa.com
culinary herbs	Golden Bough Herb Co. Ltd	Shaun Goodyer	#10-8385 St. George St.	Vancouver	BC	V5X 4P3	(604) 322-0455	(604) 322-0466	gbh@pacicgroup.net
culinary herbs	White Crane Productions Inc.	Gary Schwedock	447 10th Ave.	New York	NY	10001	(201) 795-3300		
culinary herbs	Jaycee Herb Traders Ltd.	Wolfgang Cornelia Bressier	129 Watson Rd	Guelph	ON	N1H 6H8	(519) 829-3535	(519) 829-3636	
culinary herbs	Ippolito Fruit & Produce	Joel Ippolito	1032 Howard Rd RR2	Burlinton	ON	L7R 3X5	(905) 631-7700	(905) 631-7711	www.ippioproduce.com
essential oils	Augustus Oils	(would not provide)	64 Woolmer Trading Estate	Bordon, Hampshire	England	GU35 9QF	44 (0) 1420 488555	44 (0) 1420 476777	
essential oils	Natural Extracts of Australia	melaleuna@earthlink.net	1727 N. Dillon St.	Los Angeles	CA	90026	(323) 660-7914	(323) 660-7922	
essential oils	International Flavours And Fragrances	Bipin Kahara	650 Highway 36	Hazlet	NJ	07730	(908) 329-5531		www.iff.com
essential oils	Young Living Essentials Oils	Marylou Jacobson	250 South Main St.	Payson	UT	84651	(801) 465-5400	(801) 465-5424	
essential oils	Pranarom		433 chaussee d'Enghien	Homues	Belgium	7060	32-67 34 11 34	32-67 34 11 35	www.pranaromintenational.com
medicinal herbs	Herb Shop Connection, The		P.O. Box 352	Provo	UT	84601	(801) 373-2739		
medicinal herbs	Farnam Companies (Horse Health Products)		PO Box 12068	Omaha	NE	68112	(800) 234-2269		

Market Segment	Company	Contact	Address	City	State/Province	Postalcode	Phone #	Fax #	Website/ E-mail
medicinal herbs	Whole Herb Company, The	James Thrower	250 E Blithedale Ave.	Mill Valley	CA	94941-2032	(415) 383-6484		
medicinal herbs	Gallard-Schlesinger Industries	info@gallard-schlesinger.com	777 Zeckendorf Blvd.	Garden City	NY	11530	(516) 229-4000	(516) 229-4015	www.gallard-schlesinger.com
medicinal herbs	Functional Foods Corp.	functionalfoods@aol.com	470 Route 9	Englishtown	NJ	07726	(732) 972-2232	(732) 536-9179	
medicinal herbs	Herblife International Inc.	Christopher Pair	Box 92459	Los Angeles	CA		(310) 410-9600		
medicinal herbs	Ecuadorian Rainforest LLC	ecuadorian-rainforest@worldnet.att.net	1265 McBride Ave.	West Paterson	NJ	07424-2592	(973) 237-9833	(973) 237-9838	www.ecuadorian-rainforest.com
medicinal herbs	Flora Laboratories	Allison White	149 Little Mt. Rd.	Trout Lake	WA	98650	(800) 395-6093		
medicinal herbs	Chaucer Herbs	herbs@digisys.net	37 5th St. E, Ste. 210	Kalispell	MT	59901	(406) 752-6797	(305) 489-6483	
medicinal herbs	SISU Enterprises Co. Inc.	Toni Aeichele	104A-3340 Brighton Ave.	Burnaby	BC	V5A 3H4	(604) 420-6610	(604) 420-6640	www.sisuhealth.com
medicinal herbs	DNP International Co. Inc.	sales@pnpint.com	2901 Ohio Blvd., Ste. 144	Terre Haute	IN	47803	(812) 232-2211		www.dnpint.com
medicinal herbs	CPB International Inc.	corinne@cpbweb.com	21 Union Valley Rd	Newfoundland	NJ	07435	(973) 208-6288	(973) 208-6290	www.cpbweb.com
medicinal herbs	Herbalpathic	(would not provide)	Houston Int. LLC,	Tempe	AZ	85285	(800) 883-3869		

Market Segment	Company	Contact	Address	City	State/Province	Postalcode	Phone #	Fax #	Website/ E-mail
medicinal herbs	Point Vert	Sonia Fey, Gabriel Perche	7236 Salisbury Ave.	Burnaby	BC	V5E 3A2	(604) 540-1336	(604) 540-1336	
medicinal herbs	American Health		90 Orville Dr.	Bohemia	NY	11716	(613) 567-9500		
medicinal herbs	Horizon Distributors	Ron Fransico	8335 Winston	Burnaby	BC		(604) 420-6751		
medicinal herbs	Bio-Genesis Distributors	David Turrie	9323-209 Street	Langley	BC	V1M 2G6	(604) 596-3655		
medicinal herbs	Creative Nutrition Canada Corp.	David W. Rowland	P.O. Box 99	Parry Sound	ON	P2A 2X2	(705) 746-5688	(705) 746-6367	
medicinal herbs	Asia Natural Products Inc.	Emmanuel Segmen	1603 Indians St.	San Francisco	CA	94124-1220	(415) 920-2638		
medicinal herbs	BioForce Canada Inc.	Paulette MacPherson	3108 Beta Ave.	Burnaby	BC	V5G 4K4	(604) 299-1177		
medicinal herbs	Botanicals International	Theresa Reid ex. 115	2550 El Presidio	Long Beach	CA	90810-1193	(310) 637-9566	(310) 637-3644	
medicinal herbs	Chemco Industries Inc.	(would not provide)	500 Citadel Dr., #120	Los Angeles	CA	90040	(213) 721-8300	(213) 721-9600	sales@chemcoindustriesinc.com
medicinal herbs	D.B.N. Brokerage	Barbara Nicholis	4368 East Cherokee	Phenoix	AZ	85044	(480) 598-0079	(480) 598-9091	barbaranichols@yahoo.com
medicinal herbs	Christmas Natural Foods Inc.	Mitchel C. Mahler	#201 - 8173 128th St.	Surrey	BC	V3W 4G1	(604) 591-8881	(604) 592-1784	www.christmasnaturalfoods.ca

Market Segment	Company	Contact	Address	City	State/Province	Postalcode	Phone #	Fax #	Website/ E-mail
medicinal herbs	BioResource Inc.	David Goulding	770 St. George St E	Fergus	ON	N1M 3J6	(519) 843-6941	(519) 843-4848	www.bioresource.on.ca
medicinal herbs	Christopher Enterprises	James Webster	1195 Spring Creek Place	Springville	UT	84663	(801) 489-1129		
medicinal herbs	Aphrodisia	Mary (would not provide last name)	264 Bleeker	New York	NY	10014	(212) 989-6440		
medicinal herbs	Dynamic Presence Inc.	Milton	921 N Plum Grove Rd	Schaumburg	IL	60173	(847) 240-2827	(847) 240-2863	
medicinal herbs	Naka Sales Ltd.	Mike Nacachian	53 Queen's Plate Unit 3	Etobicoke	ON	M9W 6P1	(416) 748-1555	(416) 748-3073	www.nakaherbs.com
medicinal herbs	Chromatic Marketing	Liz Decleen	7224 S. Clarkson St	Littlton	CO	80122	(330) 795-6103	(303) 798-2380	decleene@sni.com
medicinal herbs	Choice Sales & Marketing Midwest	David Butterfield	3993 N Hoyne	Chicago	IL	60618	(773) 525-5887	(773) 525-6688	info@choice-marketing.com
medicinal herbs	Ballantine Natural Sales	Dick Ballantine	1001 Deal RD	Ocean	NJ	07712	(732) 493-0552	(732) 493-3118	
medicinal herbs	Stefan Lacroix Marketing	Stefan Lacroix	4939 Sidley St	Burnaby	BC	V5J 1T5	(604) 434-9371	(604) 434-9315	simarketing@home.com
medicinal herbs	C.E. Jamieson & Co Ltd	Ed Bruno, Greg Edmonds	2 St. Clair Ave W Ste. 1502	Toronto	ON	M4V 1L5	(416) 960-0052	(416) 960-4803	www.jamiesonvitamins.com
medicinal herbs	PL Thomas & Co.	faith@plthomas.com	119 Headquarters Plaza	Morristown	NJ	07960	(973) 984-0900	(973) 984-5666	www.plthomas.com

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medicinal herbs	American International Chemical Inc.	sg@aicma.com	17 Strathmore Rd.	Natick	MA	01760	(508) 655-5805	(508) 655-0927	www.aicma.com
medicinal herbs	Kingchem Inc.	kingchem@worldnet.att.net	296 Kinderkamack Rd.	Oradell	NJ	07649	(201) 261-6002	(201) 262-9436	www.kingchem.com
medicinal herbs	Marcor Development Corp.	marcodev@aol.com	341 Mchele Place	Carlstadt	NJ	07072	(201) 935-2111	(201) 935-5223	
medicinal herbs	Maypro Industries Inc.	Tac Kurihara	2700 Westchester Ave.	Purchase	NY	10577	(914) 251-0701	(914) 251-0746	www.maypro.com
medicinal herbs	Ztec Queen	Bill Domsky	517 San Agustin #318	Laredo	TX	78040	(956) 712-3199		
medicinal herbs	Herbalist and Alchemist	David Winston	51 South Wandling Ave	Washington	NJ	07882	(800) 611-8235		www.herbalist-alchemist.com
medicinal herbs	NutriScience Innovations LLC	sales@nutriscienceusa.com	2226 Black Rock Turnpike, Ste. 206	Fairfield	CT	06430	(203) 334-3535	(203) 366-1850	www.nutriscienceusa.com
medicinal herbs	Omya Arizona	david.lapierre@omya.com	6 Noth Mesquite Rd.	Superior	AZ	85273	(800) 222-0120	(401) 884-0146	www.omya-na.com
medicinal herbs	Zia	Jude Haukom	1337 Evans Ave.	San Francisco	CA	94124	(415) 642-8339	(415) 641-2437	www.zianatural.com
medicinal herbs	Orcas International Inc./Primex Ingredients ASA	orcas@orcas-intl.com	230 Route 206, Bldg. 4, Ste. 3	Flanders	NJ	07836	(973) 252-7100	(973) 252-7104	www.orcas-intl.com
medicinal herbs	Indena USA Inc.	botanicals@indena.com	1001 4th Ave. Plaza, Ste. 3714	Seattle	WA	98154	(206) 340-6140	(206) 340-0863	www.indena.it

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medicinal herbs	Arkopharma/Health From The Sun	Miki Kincheole	PO Box 179	Newport	NH	03773	(800) 447-2229/689-7409	(603) 763-9159/(925) 689-7427	www.healthfromthesun.com
medicinal herbs	Indo World Trading Corp.	indoworld@vsnl.com	303 Prakash Chambers, 6 Netaji Subhash Mar	Daryaganj	New Delhi, India	110002	91-11-3278058	91-11-3274521	www.indo-world.com
medicinal herbs	Quality Botanical Ingredients	Dawan Clinton	500 Metuchen Rd.	South Plainfield	NJ	07080	(908) 668-0088	(908) 561-9682	www.4qbi.com
medicinal herbs	Westco Fine Ingredients	steve@westcofine.com, rene@westcofine.com	12551-61 Saticoy St. S	North Hollywood	CA	91605	(908) 879-5830	(908) 879-6920	
medicinal herbs	Cana Co.	Hans Yzenbrandt	RR #1, 19300 Scwgog point RD	Nestleton	ON	L0B 1L0	(905) 986-9972	(905) 982-9972	
medicinal herbs	Athena Herbals	Kim Creighton	3300 Springfield Dr.	Richmond	BC	V7E 1Y8	(604) 448-0255	(604) 448-0265	athenaherbals@telus.net
medicinal herbs	Axel Kraft International	Ron Calmes	99 Engelhard Dr.	Aurora	ON	L4G 3V1	(905) 841-6840	(905) 841-6841	www.axelkraft.com
medicinal herbs	Bayer Consumer Care	Kevin Skinner	77 Belfield Rd.	Etobicocke	ON	M9W 1G6	(416) 248-0771	(416) 248-3066	www.bayer.com

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medicinal herbs	Added Dimensions	Del Anderson	#3 603 77TH Ave SE	Calgary	AB	T2H 2B9	(403) 253-3099		delander@added-dimensions.com
medicinal herbs	Purity Life Health Products	Deanne Parkes	6 Commercial Crescent	Action	ON	L7J 2X3	(519) 853-3511	(519) 853-4600	dchapman@purity life.com
medicinal herbs	Traco Labs	jenny.westfall@tracolabs.com	3102 Clark Rd.	Champaign	IL	61822	(217) 352-5800	(217) 352-6433	www.tracolabs.com
medicinal herbs	Carolwood Corporation	Yvon Bailey	1100 Burloak Dr.	Burlington	ON	L7L 6B2	(905) 319-7974	(905) 319-7978	www.msn.com
medicinal herbs	Pharmed Medicare	pharmed@vsnl.com	Pharmed Gardens, Whitefield Rd.	Bangalore	India	560 048	91-80-841-0158	91-80-841-0177	
medicinal herbs	Tree of Life, Inc. Ashley Koffman Foods	Sally Byrd, extension 2049	2600 61st Ave S.W.	Calgary	AB	T2C 4V2	(403) 279-8998		
medicinal herbs	Horizon Herbs	Richo Cech	Box 69	Williams	OR	97544	(503) 846-6704		
medicinal herbs	Curanderos LTd	(would not provide)	PO Box 1009, station K	Toronto	ON	M4P 2V3	(416) 544-0001	(416) 544-1100	www.curanderos.net
medicinal herbs	Trout Lake Farm Company	Brian Rust	149 Little Mountain Road	Trout Lake	WA	98650-9707	(509) 395-2025	(509) 395-2645	
medicinal herbs	Tom's of Maine	Sharon	PO Box 710	Kennebunk	ME	04043	(800) 367-8667		www.tomsofmaine.com
medicinal herbs	Herb Works, The	Rob Shaw	1007 York Road, Unit 5	Guelph	ON	N1E 6Y9	(519) 824-4280	(519) 824-2674	

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medicinal herbs	Puresource Inc.	Randy Betts	355 Michener Road, Unit 2	Guelph	ON	N1K 1E8	(519) 826-7585	(519) 826-9142	www.puresource.ca
medicinal herbs	Wild Rose Laboratories	Julia	#203-8173 128th St.	Surrey	BC		(604) 591-8881		
medicinal herbs	IHT Health Products Inc.	psantos@ihthealthproducts.com	225 Long Ave.	Hillside	NJ	07205	(973) 926-1941	(973) 926-2081	
medicinal herbs	H&A (Canada) Industrial Inc.	Ann On	1160 Tapscott Rd.	Toronto	ON	M1X 1E9	(416) 412-9518	(416) 293-9066	www.hacanada.com
medicinal herbs	Natural Factors Nutritional Products	Shauna Pratt	3655 Bonnevile Place	Burnaby	BC	V3N 4S9	(604) 420-4229	(604) 420-0743	www.naturalfactors.com
medicinal herbs	RIA International LLC	Skipp Silvermann	9 Whippany Road	Whippany	NJ	07981	(973) 581-1282	(973) 581-1283	www.riausa.com
medicinal herbs	Heart Smart Foods Inc.	Alex Turkington	118 Sioux Rd.	Sherwood Park	AB	T8A 3X5	(780) 467-4525	(780) 467-4590	
medicinal herbs	4 Life Nutrition	Zoli Hargitai	509 - 1755 Robson St.	Vancouver	BC	V6G 3B7	(604) 605-6968	(604) 605-3034	www.california-fitness.com
medicinal herbs	American Nutrition Inc.	Renzo Passaretti	76 Wellington St. N.	Hamilton	ON	L8R 1N1	(905) 552-6290	(905) 552-1602	www.labrada.com

18.3 Processors

Market Segment	Company	Contact	Address	City	State/Province	Postalcode	Phone #	Fax #	Website/ E-mail
culinary herbs	Krinos Foods Canada Ltd.		251 Doney Cres.	Concord	ON	L4K 1P6	(905) 669-4414	(905) 669-5709	
culinary herbs	Elanco - Indianapolis		500 East 96th Street Suite 125 - IN	Indianapolis	IN	46240	(800) 428-4441	(317) 276-6116	www.elanco.com
culinary herbs	McCormick Canada Inc.	Jack Meyers	3340 Orlano Dr	Mississaga	ON	L4V 1C7	(905) 678-1220		www.mccormick.com
culinary herbs	Caldwell Bio Fermentation	Alain Lafrance	189 de la Riviere Road	Martinville	QC	J0B 2A0	(819) 835-9277	(819) 842-2046	www.bioloacto.com
culinary herbs	Virginia Dare		882 3rd Ave.	Brooklyn	NY	11232	(718) 788-1776	(718) 768-3978	www.virginiadare.com
culinary herbs	Sabinsa Corp. (Utah Office)	Todd Norton	750 S. Innovation Cir.	Payson	UT	84651	(801) 465-8400	(801) 465-8600	www.sabinsa.com
culinary herbs	Kellogg Canada	Christine Lowry	6700 Finch Ave. W.	Toronto	ON	M9W 5P2	(416) 675-5232		www.kelloggs.ca
culinary herbs	Helman Associates International Inc.	Philip Helman	4196 Suffolk Way	Pleasanton	CA	94588-4119	(510) 484-5000	(510) 484-5007	
culinary herbs	H2O Plus-Get Your Phyll Inc.	Potoula Claypack	P.O Box 67081, 2300 Yonge St.	Toronto	ON	M4P 1E0	(416) 410-3215	(416) 410-2676	www.getyourphyll.com

Market Segment	Company	Contact	Address	City	State/Provlnce	Postalcode	Phone #	Fax #	Website/ E-mail
culinary herbs	Yerbalatina	herbs@digisys.net	Rua Odilon Mader, 1222 Alvarado	Paranagua	Paran, Brazil	83206-120	55-41-423-4043	55-41-423-2591	www.yerbalatina.com
culinary herbs	Yves Veggie Cuisine	Gerry Amantea	1638 Derwent Way	Vancouver	BC	V3M 6R9	(604) 515-4461		www.yvesveggie.com
essential oils	Aroma Vera		Postbus 1097, 1300 BB	Almere	Netherlands		(036) 534-7851	(036) 548-9253	www.aromavera.nl
essential oils	Omega Nutrition Canada, Inc.	Arne Elias	1924 Franklin St.	Vancouver	BC	V5L 1R2	(604) 253-4677	(604) 253-4893	www.omeganutrition.com
essential oils	Kalama Chemical	Gary Gross	1296 NW Third	Kalama	WA	98625	(360) 673-2550 ex. 280		
essential oils	J. Manheimer Inc.	Steve Manhiemer			NY	NY	(718) 392-7800	(718) 392-7945	
essential oils	Tisserand	Robert Tisserand	Newtown Road	Hove	Sussex, UK	BN3 7BA	44 (0)1273 325666	44 (0)1273 208444	www.tisserand.com
essential oils	Oshadhi USA	info@oshadhiusa.com	1340-G Industrial Avenue	Petaluma	CA	94952	(888) 674-2344	(707) 769-7342	www.oshadhiusa.com
essential oils	POS Pilot Plant Corp.	Drew Britz	118 Veterinary Rd.	Saskatoon	SK	S7N 2R4	(306) 978-2800	(306) 975-3766	www.pos.ca
essential oils	Bioriginal Food and Science Corp	Jerome Konecsni	102 Melville St.	Saskatoon	SK	S73 0R1	(306) 975-1166	(306) 242-3829	www.bioriginal.com

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essential oils	Auroma International inc	Indigo Sundari	1100 Lotus Dr. Box 1008	Silver Lake	WI	53170	(262) 889-8569	(262) 889-8591	
essential oils	Biolandes	Benit Nicol, raw mat buyer.	600 Meadowlands Parkway, Suite 18	Secaucus	NJ	07094	(201) 325-8733	(201) 325 8734	www.biolandes.com
essential oils	Aura Cacia	Erica Reneud	P.O. Box 311	Norway	Iowa	52318	(800) 437-3301	1-800-717-4372	www.auracacia.com
essential oils	Guangxia (Yinchuan) Industry Ltd.	guangxiaUSA@msn.com	22727 Hwy. 99, Olympic Financial Center, Ste. 207	Edmonds	WA	98026	(425) 673-5770	(425) 672-3481	www.guangxiaUSA.com
essential oils	Aromaland	Yvonne Boswell	1326 Ruflina Circle	Santa Fe	NM	87505	(800) 648-1123	(800) 852.4722	www.aromaland.com
essential oils	Poia Naturals	Alex Thomson	21B island Ford Road	Brampton	ON		(905) 840-5459		
essential oils	Good Scents Company, The	Bill Luebke	1977 East Montana Ave.	Oak Creek	WI	53154	(414) 764-2659	(414) 764-6035	
essential oils, culinary herbs	StarWest Botanicals	Sue Hall	11253 Trade Center Dr.	Rancho Cordova	CA	95742	(916) 638-8100	(916) 638-8293	www.starwest-botanicals.com
medicinal herbs	Laverna Products	Thomas Haase	3937 Nobel Dr., Suite 212	San Diego	CA	92122	(858) 622-9452	(858) 622-9451	www.laveraonline.com
medicinal herbs	ADH Health Products Inc.	Ashwin Advani	215 North Rt. 303	Congress	NY	10920	(845) 286-0027	(845) 268-2988	www.adhhealth.com

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medicinal herbs	Nutraceutical Corporation	Mark Nasabal	1500 Kears Blvd., B200	Park City	UT	84060	(435) 658-3503		
medicinal herbs	Coast Comfort		1000 Hay Street	Coquitlam	BC	V3C 4R2	(604) 552-2731	(604) 552-9206	www.coast-comfort.ca
medicinal herbs	P.L. Thoman & Co., Inc.	H. Scott Rosenbush ex. 223	119 Headquarters Plaza	Morristown	NJ	07960	(973) 984-0900 ex. 223	(973) 894-5666	www.plthomas.com
medicinal herbs	Crystal Star, Herbal Nutrition	Linda Page	4069 Wedgeway Ct.	Earth City	MO	63045	(800) 736-6015	(800) 260-4349	
medicinal herbs	Burt's Bees	(would not provide)	PO Box 13489	Durham	NC	27709	(800) 849-7112	(800) 429-7487	www.burtsbees.com
medicinal herbs	Minaloa	Ingrid Thom	20992 Bake Parkway, Suite 112	Lake Forest	CA	92630	(949) 460-7363	(949) 951-2878	www.minaloa.com
medicinal herbs	Bee Health	Bridgette Ryan	Racecourse Rd.	East Ayton	Scarborough, North Yorkshire	Y013 9HT	+44 (0) 1723 864001	+44 (0) 1723 862455	www.beehealth.co.uk
medicinal herbs	Linnea		6595 Riazzino	Via Cantonale	Switzerland		41 (0) 91 8595959	41 (0) 91 8505070	e-mail:sales@linnea-worldwide.com

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medicinal herbs	Wonder Trading (USA) Inc.	wondertradingusa@juno.com	1905 E. 17th St., Ste. 212	Santa Ana	CA	92705	(714) 558-6837	(714) 558-6839	www.wondertradingusa.com
medicinal herbs	Vita Health	Jill Bianco ex. 1614	901 E. 233rd Street	Carson	CA	90745	(310) 835-8400	(310) 952-7760	www.leiner.com
medicinal herbs	Confab Laboratories Inc.	Eric Reed	4355 Sir Wilfred Laurier Blvd	St Hubert	QC	J3Y 3X3	(450) 443-6666	(450) 443-4466	www.confab.ca/contact/htm
medicinal herbs	BioSuisse	Gérald Bidawid	37, Route de Chésalles	1723 Marly	Switzerland		+41 (0)62 865 72 72	+41 (0)62 865 72 73	www.bio-suisse.ch
medicinal herbs	Crosspoint Trading Co. Ltd	Edmundo Reyes	745 Clark Dr.	Vancouver	BC	V5L 3J3	(604) 255-1554	(604) 215-9559	crosspoint@sprint.ca
medicinal herbs	U.S. Nutraceuticals	rxgonzalez@usnutra.com	2231 W. Highway 44, Ste. 3	Eustis	FL	32726	(352) 357-2004	(352) 483-2095	www.usnutra.com
medicinal herbs	DC Labs Limited	David Fessen	795 Pharmacy Ave	Scarborough	ON	M1L 3K2	(416) 752-8630	(416) 752-8633	
medicinal herbs	Stormont, Dundas & Glengarry Community Develpoment	Lanes dePater,Executive Director	20 Pitt Street	Cornwall	ON		(613) 932-4333	(613) 932-0596	www.sdg.on.ca
medicinal herbs	Albi Imports Ltd.	Leo Albo	8980 Fraserway crt suite 15	Burnaby	BC	V5J 5H7	(604) 438-1054	(604)438-2029	www.albiimports.com

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medicinal herbs	Honso USA Inc.	Dan Wen	1438 W. Broadway Rd. Suite B-210	Tempe	Arizona	85282	(480) 377-8787	(480) 377-6649	www.honso.com
medicinal herbs	Buttefly Weed Herbals	Denise Williams	360A Bloor St W., Suite 19022	Toronto	ON	M5S 1X1	(416) 658-4372	(416) 658-4373	
medicinal herbs	Stryka Botanicals Co. Inc.	Anthony M. Calvoni	21218 Vanowen St.	Canoga Park	CA	91303	(818) 227-0555	(818) 227-0560	www.stryka.com
medicinal herbs	Canada Seabuckthorn Ent.	Colin Mcloughlin	RR 2, Site 33, Comp 24	Peachland	BC	V0H 1X0	(250) 767-9188	(250) 767-9156	www.seabuckthorne.com
medicinal herbs	CanCap Pharmaceutical	Ju-Nee Yeo	180-13111 Vanier Place	Richmond	BC	V6V 2J1	(604) 278-2188	(604) 278-2210	capcapltd@aol.com
medicinal herbs	Bodyonics	(would not provide)	140 Lauman Lane	Hicksville	NY	11801	(800) 899-2749	(516) 822-6503	
medicinal herbs	Lotus Brands Inc.	Scott Seering	2143 Greenbud	Mosinee	WI	54455	(715) 359-7658	(715) 359-9289	email: seering@dwave.net
medicinal herbs	Vita Tech	Greg Williford	2832 Dow Ave	Tustin	CA	92780	(714) 832-9700	(714) 731-8482	e-mail:gregw@vitatech.com
medicinal herbs	Sunmore Health Tech Ltd.	Catherine Kao	925 McGill Place	Kamloops	BC	V2C 6N9	(250) 374-3017	(250) 374-3011	
medicinal herbs	Aurium Pharma Inc.	Jenny Tsulis	7577 Keele St. #102	Concord	ON	L4K 4X3	(905) 669-9057	(905) 669-0781	www.aurim.ca

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medicinal herbs	Penta Manufacturing		P.O. Box 1448	Fairfield	NJ	07007	(201) 575-7475		http://www.pentamfg.com/
medicinal herbs	Tiancheng International (USA) Inc.	tiancheng@tianchengusa.com	13267 Yorba Ave., Ste 5	Chino	CA	91710	(909) 364-9888	(909) 364-9878	www.tianchengusa.com
medicinal herbs	Nature's Formula	Barbara Johnstone		Westbank	BC		(250) 769-9389		
medicinal herbs	Herbs Etc.	Daniel Gagnon	1310 Rufina Circle	Santa Fe	NM	87501	(505) 471-6488		
medicinal herbs	East Earth Herb Inc. (a division of A.M. Todd Botanicals)	Peggy Brevoort, peggyb@pond.net	4091 west 11th Ave	Eugene	OR	97402	(541) 687-0155	(541) 485-7347	www.eastearth.com
medicinal herbs	Flavor Chemic	Lou Gorassi	465 Milner Ave, unit #9	Toronto	ON	M1B 2K4	(416) 321-2124	(416) 321-8231	www.flavorchemic.ca
medicinal herbs	Robinson Pharma Inc	Kai Lee, purchasing agent	3330 S. Harbor Blvd.	Santa Ana	CA	92704	(714) 241-0235	(712) 751-6066	www.info@robinsonpharma.com
medicinal herbs	Health From The Sun	Jason Barton	22 N. Main St. PO Box 179	Newport	NH	03773	(480) 704-0028	(603) 763-9159	email efa@hfts.com
medicinal herbs	Better Botanicals	Josh	335 Victory Dr.	Herndon	Virginia	20170	(800) 224-3727		www.betterbotanicals.com
medicinal herbs	Natures Gate/Levlad Inc.	Ron Anders	9200 Mason Ave.	Chatsworth	CA	91311	(818) 882-2951		www.levlad.com
medicinal herbs	Naturlite/KR Natural Products	David Khang	23679 Calabasas Rd. #526	Calabasas	CA	91302	(800) 200-7890	(800) 268-9941	www.platinumnaturals.com

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medicinal herbs	Bio-Botanica Inc.	Angela M. Yervasi	75 Commerce Dr.	Hauppauge	NY	11788	(800) 645-5720	(516) 231-7332	www.bio-botanica.com
medicinal herbs	Beehive Botanicals	Sandra Shumaker	16297 W Nursery Rd.	Haywar d	WI	54843	(715) 634-3523	(715) 634-4274	email: beehive @win.bright.net
medicinal herbs	Celestial Seasonings	Kay Wright	4600 Sleepytime Dr.	Boulder	CO	80301-3292	(303) 530-5300	(303) 581-1332	
medicinal herbs	Wilcox Drug Co. (Wilcox Natural Products)	Anthony Hayes	Box 391	Boone	NC	28607	(704) 264-3615	(704) 264-2831	
medicinal herbs	Rhema Industries Ltd.	Allan Pinkme	#110-3738 North Fraser Way	Burnaby	BC	V5J 5G7	(604) 430-5211	(604) 430-4714	www.rhemaindustries.com
medicinal herbs	Boerick & Tafel	Micheal Gager ex. 201	2381 Circadian Way	Santa Rosa	CA	95507	(800) 876 9505		bandt@boericke.com
medicinal herbs	Trophic Canada Ltd.	Ron Francisco	260 Okanagan Ave. E	Penticton	BC	M8Z 2R5	(250) 492-8820	(250) 492-5066	www.hypericum.ca
medicinal herbs	Ginko Group	Frank Z. Li	2211 S. Hacienda Blvd.	Hacienda Heights	CA	91745	(626) 333-8272	(626) 333-1262	email:jinkegroup@aol.com
medicinal herbs	Trans-Herb (e) Inc.	Karine Pomerleau	2115, de la Province	Longuiel	QC	J4G 1Y6	(514) 679-7999	(514) 679-0857	www.transherb.com
medicinal herbs	North American Hemp Company	Georgia Nemkov	PO Box 6084	Malibu	CA	90264	(310) 589-5970	(310) 589-9479	email:lnemkov@northamericanhemp.com

Market Segment	Company	Contact	Address	City	State/Provlnce	Postalcode	Phone #	Fax #	Website/ E-mail
medicinal herbs	Se-cure		Hayarmuch St.	Yavne	Israel	81103	972-8-9430127	972-8-9430163	www.tofupill.com
medicinal herbs	San Francisco Herb Co.	Neil Hanscomb	250 14th St.	San Fransisco	CA	94103-2495	(415) 861-7174		
medicinal herbs	Levlad Inc.	Rhonda Vilardo, raw mat. Ron Andes ex 130	9200 Mason Ave.	Chatsworth	CA	91311	(818) 882-2951	(818) 341-3840	
medicinal herbs	Quest Vitamin Supplies Ltd.	Neil Burgess	1781 West 75th	Vancouver	BC	V6P 6P2	(604) 261-0611		
medicinal herbs	Organika Health Products Inc.	G. Chin	11871 Hammersmith Way	Richmond	BC	V7A 5E5	(604) 277-3302	(604) 231-3352	www.organika.com
medicinal herbs	Nature's Sunshine Products	Ellen O'Neal	75 East 1700 South	Provo	UT	84606	(801) 798-4200		www.naturessunshine.com
medicinal herbs	Food Science of Vermont	Linda Grimes	20 New England Dr.	Essex Junction	VT	05453	(800) 874-9444	(802) 878-0549	www.foodscienceofvermont.com
medicinal herbs	McZand Herbal Inc.	Janet Zand, Mark Tengler, Michael McGuffin	Box 5312	Los Angeles	CA	90409	(310) 822-0500	(310) 822-1050	
medicinal herbs	Canadian PhytoPharmaceuticals	Yuan-Chun Ma	#6-13520 Crestwood Place	Richmond	BC	V6V 2G2	(604) 303-7782	(604) 303-7726	www.intergate.bc.ca/business/canphyto

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medicinal herbs	Nutrient Express, The	Yda Brink	300-377 Mountain Highway	N. Vancouver	BC	V7J 3P2	(604) 903-7333	(604) 903-7332	www.gcinutrients.com
medicinal herbs	Natural Balance Products Inc.	Roy Kiss	4672 Adelaide St.	Port Alberni	BC	V9Y 6N4	(250) 723-2217	(250) 723-2216	www.naturalbalanceproducts.com
medicinal herbs	Emerald Seed Products Ltd.	Cal Kelly	P.O. Box 3923	Regina	SK	S4P 3R8	(306) 924-2033	(306) 924-1988	emeraldseed@sk.sympatico.ca
medicinal herbs	HerbTech	Ian Cabral	8625 - 112 St., Suite 308	Edmonton	AB	T6G 1K8	(780) 432-0022	(780) 432-7772	www.herbtech.com
medicinal herbs	Echo Oils Inc.	Jason Carnahan	2148 Haaglund Rd.	Christina Lake	BC	V0H 1E3	(250) 447-7661	(250) 447-7661	www.echo-oils.com
medicinal herbs	Du-Var Laboratories Inc.	Louise Nadon	1460 Graham Bell	Boucherville	QC	J4B 6H5	(450) 641-4740	(450) 641-4743	
medicinal herbs	Wise Owl Herbs Co. Ltd.	Bill Rak	P.O. Box 569	Unity	SK	S0K 4L0	(306) 228-3974	(306) 228-3049	www.wiseowlherbs.com
medicinal herbs	Twin Labs Corporation, Utah Division	Bryan Hatch	600 East St.	Salt Lake City	UT		(801) 363-4060		www.twinlab.com
medicinal herbs	NuSkin Canada	Paul Hanson	4085 Sladeview Cres.	Mississauga	ON	L5L 5X3	(905) 569-5100	(905) 569-5109	www.nuskin.com
medicinal herbs	Nutravite Pharmaceuticals Inc.	Sean Lidstone	Unit 2 - 1470 Leathead Road	Kelowna	BC	V1X 7J6	(250) 712-0600	(250) 712-0617	www.nutravite.com

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medicinal herbs	Eurolabs Canada Ltd.	Butch Attersoll	3105 Unity Dr., Unit 3	Mississauga	ON	L5L 4L1	(905) 569-0878	(905) 569-9425	www.interlog.com/~eurolabs/who.htm
medicinal herbs	JAMP Pharma Corp.	Michael Joaquin	8065 Aitken Rd.	Chilliwack	BC	V2R 4H5	(604) 795-7988	(604) 795-7986	jamp@universe.com
medicinal herbs	Kamloops Ginseng Co. Ltd.	Bev Wardstrom	4 - 1425 Caribou Pl.	Kamloops	BC	V2C 5Z3	(250) 374-2387	(250) 374-2389	www.com-star.com/ginseng
medicinal herbs	Celex Laboratories Inc.	Steven Liao	#310 - 19358 96 Ave.	Surrey	BC	V4N 4C1	(604) 888-1235	(604) 888-7322	
medicinal herbs	Bristol-Myers Squibb Canada	Nancy Baines	P.O Box 60237 Stn., Brm B	Toronto	ON	M7Y 2H1	(888) 422-5247		www.bms.com
medicinal herbs	Whitehall-Robins Inc.	Christopher Clark	5975 Whittle Rd.	Mississauga	ON	L4Z 3M6	(905) 507-7000	(905) 507-7110	
medicinal herbs	Wampole Canada Inc.	Rodney Leeson	465 Milner Ave., Unit 1	Scarborough	ON	M1B 2K4	(416) 754-0086	(416) 754-0170	www.wampole.ca
medicinal herbs	Wyeth-Ayerst Canada Inc.	Etienne Attar	1025 Marcel-Laurin Blvd.	St-Laurent	QC	H4R 1J6	(514) 744-6771	(514) 744-9864	
medicinal herbs	CV Technologies Inc.	Ian Cabral	#308 Campus Twr, 8625 - 112 St.	Edmonton	AB	T6G 1K8	(780) 431-0022	(780) 432-7772	www.herbtech.com
medicinal herbs	Fytokem Products Inc.	Greg Dutka	101 - 110 Research Dr.	Saskatoon	SK	S7N 3R3	(306) 668-2552	(306) 978-2436	www.fytokem.com
medicinal herbs	Terry Laboratories Inc.	gaf@terrylabs.com	390 N. Wickham Rd., Ste. F	Melbourne	FL	32935	(321) 259-1630	(321) 242-0625	www.terrylabs.com

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medicinal herbs	Asian Herbs and Nutritionals	Anu Verma	4 - 130 Glacier St.	Coquitlam	BC	V3K 5Z6	(604) 945-6744	(604) 945-6745	asianherbs@direct.com
medicinal herbs	GFR Nutritionals Ltd.	L. Schanfarber	11405 - 201 A St.	Maple Ridge	BC	V2X 0Y3	(604) 460-8440		www.gfmutitionals.com
medicinal herbs	Deseret Laboratories Inc.	Lenny Jones	1414 East 3850 South	St. George	UT	84790-6233	(435) 628-8786		
medicinal herbs	Global Pharm Inc.	Peter Yuen	865 York Mills Rd.	Toronto	ON	M3B 1Y5	(416) 443-2225	(416) 443-2200	www.globalpharminc.com
medicinal herbs	Weider Nutrition International	Joe Laurenzi	2002 South 5070 West	Salt Lake City	UT	84104	(801) 975-5000		www.weider.com
medicinal herbs	Dr. Christopher's Original Formulas		311 North Freedom Blvd.	Provo	UT	84601	(801) 373-8978		
medicinal herbs	Enerex Botanicals Ltd.	Yvetta Carlsen	2 - 3011 Murray St.	Port Moody	BC	V3H 1X3	(604) 461-1944	(604) 461-1946	www.enerex.bc.ca
medicinal herbs	Monarch Labs		P.O. Box 12217	Ogden	UT	84412	(801) 392-9111		
medicinal herbs	Enzymatic Therapy Canada Inc.	Michael Murray	8500 Baxter Place	Burnaby	BC	V5A 4T8	(604) 421-0777	(604) 421-0557	www.enzy.com
medicinal herbs	Fresh Hemp Foods Ltd.	Alex Chwaieusky	15 - 2166 Notre Dame Ave.	Winnipeg	MB	R3H 0K2	(800) 665-4367	(204) 956-5984	www.hemperor.com

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medicinal herbs	FREGA Inc.	Serge Vachon	P.O. Box 100 8750 Rive-Sud Blvd.	Levis	QC	G6V 6N6	(418) 835-2426	(418) 835-1426	
medicinal herbs	Fortius Inc.	Lynda Bodelar	P.O. Box 700, Calgary South	Calgary	AB	T2H 2H2	(403) 640-6000	(403) 212-5281	www.fortius.ca
medicinal herbs	Formulex Canada Inc.	John Khazoom	5950 chemin Cote-de-Liesse	Mt-Royal	QC	H4T 1E2	(514) 733-7146	(514) 733-9320	www.formulex.com
medicinal herbs	Forbes Medi-Tech Inc.	Seff Motley	Suite 200 - 750 West Pender St.	Vancouver	BC	V6C 2T8	(604) 689-5399	(604) 689-7641	www.forbesmedi.com
medicinal herbs	Flash 5 Energy Foods	Allison Schroeder	2820 Huntington Place	Port Coquitlam	BC	V3V 4T3	(604) 464-4511	(604) 464-4513	www.flash-5.com
medicinal herbs	Dolisos Canada Inc.	Pascal Frochisse	1400 Hocquart	St-Bruno	QC	J3V 6E1	(450) 441-2121	(450) 441-6212	www.dolisos.com
medicinal herbs	Albion Labs	Brett Ashmead	P.O. Box 750	Clearfield	UT	84089	(800) 453-2406		
medicinal herbs	Kaden Biochemicals Inc.		17 Camden Rd.	Hillsborough	NJ	08844	(908) 359-8846	(908) 359-8856	www.kadenbio.com
medicinal herbs	Roche Vitamins		45 Waterview Blvd.	Parsippanny	NJ	07054-1298	(973) 257-8355	(973) 257-8414	
medicinal herbs	Biozymes Inc.	Francis Bellavance	480 Perrault St.	St-Romuald	QC	G6W 7V6	(418) 834-0084	(418) 834-5934	www.total.net/~biozymes

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medicinal herbs	Atrium Biotechnologies	Richard Bordeleau	1405 Parc-Technologique Blvd.	Quebec	QC	G1P 4P5	(418) 652-1116	(418) 652-0151	www.atrium-bio.com
medicinal herbs	Linnea Inc.	dstanek@linnea-worldwide.com	435 McCartney St.	Easton	PA	18042	(610) 253-7950	(610) 253-7970	www.linnea-worldwide.com
medicinal herbs	Nutravim Nutraceutical Inc.	Brad Grimes	100 Fairford St. W	Moose Jaw	SK	S6H IV3	(306) 694-8455	(306) 694-8456	www.nutravim.com
medicinal herbs	Solgar Vitamin and Herb	Connie Losito	500 Willow Tree Rd	Leonia	NJ	07605-2232	(201) 944-2311		www.solgar.com
medicinal herbs	Jerusalem PhytoMedicine	eitan@jpmed.co.il	33 Alon St.	Karme-losef, POB 3958	Israel	99797	972-3-6775355	972-3-5747799	www.jpmed.co.il
medicinal herbs	Naturex Inc.	naturex@westnet.com	300 Waverly Ave.	Mamaroneck	NY	10543	(914) 381-5995	(914) 381-5985	
medicinal herbs	Soft Gel Technologies/OptiPure	sales@soft-gel.com	6982 Bandini Blvd.	Los Angeles	CA	90040	(323) 726-0700	(323) 726-7065	www.soft-gel.com, www.optipure.com
medicinal herbs and spices	Frutarom Inc.	Elaine Randolph, ex. 249	9500 Railroad Ave.	North Bergen	NJ	07047	(201) 861-9500	(201) 861-9267	www.frutarom.com
medicinal herbs and spices	BDS Natural Products	bdsnatural@aol.com	1904 1/2 E. Dominguez St.	Carson	CA	90810	(310) 518-2227	(310) 518-2577	www.bdsnatural.com

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medininal herbs	Advanced Nutritech Systems Inc	Saul Katz	New Era Place,10519-99 Ave1	Edmonton	AB	T5K 0E7	(780) 423-4551	(780) 423-1786	www.nutritech.com
spice	Loretta Foods Ltd.		2405 Lucknow DR.	Mississauga	ON	L5S 1H9	(905) 678-9250	(905) 678-0733	
spice	Arsam Spices	Remesh Patel	1370 Don Mills Rd, Suite 300	Don Mills	ON	M3M 3N7	(416) 285-4784	(416) 285-4784	
spices	Anderson Seed Cleaning	Trevor W. Anderson	Box 12	Frontier	SK	S0N 0W0	(306) 296-4545	(306) 296-4514	
spices	Baxter Seed Farm	Daniel Baxter	R.R. #3	North Battleford	SK	S9A 2X4	(306) 445-5414	(306) 445-5414	
spices	Annand Agro Services Ltd.	Glenn Annand	Box 442	Mossbank	SK	S0H 3G0	(306) 354-7675	(306) 354-7675	annand.agro@sk.sympatico.ca
spices	Allied Old English	Bobbi James/Fred Ross	100 Markley Street	Port Reading	NJ	07064	(732) 636-2060		www.alliedoldenglish.com
spices	Griffith Laboratories Ltd.	(would not provide)	757 Pharmacy Ave	Scarborough	ON	M1L 3J8	(416) 288-3050	(416) 288-3481	
spices	Hermann Laue Spice Company	Walter Knecht	119 franklin St	Uxbridge	ON		(905) 852-5100	(905) 852-1113	www.helacanada.com
spices	Aldor Farms Ltd.	Bob or Lorne Wallace	Box 120	Tyner	SK	S01 3H0	(306) 574-2167	(306) 574-2123	

Market Segment	Company	Contact	Address	City	State/Province	Postalcode	Phone #	Fax #	Website/ E-mail
spices	Wallace Enterprises Inc.	Wayne B. Wallace	Box 5	Tyner	SK	S0L 3H0	(306) 574-4229	(306) 574-4841	w.wallace@sk.sympatico.ca
spices	Dartmore Farms Ltd.	Clare Ward	Box 1000	Aylsham	SK	S0E 0C0	(306) 862-5015	(306) 862-3075	
spices	Delorme Seeds	Gerald Delorm	Box 13	Assiniboia	SK	S0H 0B0	(306) 642-5793	(306) 642-5276	
spices	UFL Foods Corp.		450 Superior Blvd.	Mississauga	ON	L5T 2R9	(905) 670-9697	(905) 670-7751	qmillichamp@uflfoods.com
spices	Eskdale Seed Farm Ltd.	Rob Heggie	R.R. #1	Leross	SK	S0A 2C0	(306) 675-2222	(306) 675-2225	
spices	Fraser's Seed Farm Ltd.		Box 160	Paynton	SK	S0M 2J0	(306) 895-2042	(306) 895-4250	rman@point2.com
spices	Gibbs, Bryan	Bryan Gibbs	Box132	McTaggart	SK	S0G 3G0	(306) 842-5990		
spices	Horton Spice Mills Ltd.		256 Steelcase Rd W	Uxbridge	ON	L3R 1B3	(905) 475-6130	(905) 475-7035	
spices	Keyser Farms Ltd.	Rob Keyser	Box 339	Cupar	SK	S0G 0Y0	(306) 723-4949		
spices	Cara District Seed Cleaning	Larry Ostoforoff	Box 1660	Cara	SK	S0A 0L0	(306) 563-4303	(306) 363-4306	
spices	Canadian Pulse and Milling	Lionel Ector	Box 94	Elbow	SK	S0H 1J0	(306) 644-4704	(306) 644-4706	lionelector.stulor@sk.sympatico.ca
spices	Beld Enterprises	Brian Neufeld	Box 1268	Preeceville	SK	S0A 3B0	(306) 547-4631		

Market Segment	Company	Contact	Address	City	State/Province	Postalcode	Phone #	Fax #	Website/ E-mail
spices	Pheasant Hill Seed Farm	Ron McKinnon	Box 160	Abernethy	SK	S0A 0A0	(306) 333-2069	(306) 333-4924	bmckinn@sk.sympatico.ca
spices	Preeceville Quality Seed Cleaning	Brian - manager	Box 1115	Preeceville	SK	S0A 3B0	(306) 547-4664	(306) 547-4631	
spices	Riverview Seeds Ltd.	Mel Goldade	Box 205	Nipawin	SK	S0E 1E0	(306) 862-4333	(306) 862-5562	
spices	Petracek Seed Farm Ltd.	Ted Petracek	Box 427	Churchbridge	SK	S0A 0M0	(306) 745-3829		
spices	Manitou Custom Seed Cleaning	Scott Murray	Box 161	Young	SK	S0K 4Y0	(306) 259-4944	(306) 259-4476	
spices	Lenmar Seed Farm	Bob Pfeifer	Box 146	Lemberg	SK	S0A 2B0	(306) 335-2994	(306) 335-2994	
spices	Beeler Seeds	Donna Edwards	Box 160	Nokomis	SK	S0G 3R0	(306) 528-2128	(306) 528-2170	lr.edwards@sk.sympatico.ca
spices	Lakeside Seeds	Glen Laxdal	Box 1660	Wynyard	SK	S0A 4T0	(306) 554-2098	(306) 554-2867	
spices	Cay Seeds Ltd.	Randy Cay	Box 672	Kinistino	SK	S0J 1H0	(306) 864-3696	(306) 864-2456	cayseeds@sk.sympatico.ca
spices	Thiel Seeds Ltd.	Gary Thiel	Box 413	Shellbrook	SK	S0G 2E0	(306) 747-3947	(306) 747-2356	
spices	Wiberg Corp.		931 Equestrian cres.	Oakville	ON	L6L 6L7	(905) 825-9900		
spices	Gilchrist Seed Farms Ltd.	Armand Gilchrist	Box 1136	Rosetown	SK	S0L 2V0	(306) 882-2901	(306) 882-2543	
spices	Greenleaf Seeds Ltd.	Erwin Mayerle	Box 1180	Tisdale	SK	S0E 1T0	(306) 873-4261	(306) 873-4280	

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spices	Silhouette Seeds	Jean Denis	Box 216	Domremy	SK	S0K 1G0	(306) 423-6283	(306) 423-5541	silhouette@sk.sympatico.ca
spices	Tomtene Seed Farm	Terry Tomtene	Box 116	Birch Hills	SK	S0J 0G0	(306) 749-3554	(306) 749-3371	
spices	Reckitt & Colman Canada Inc.		2275 52nd Ave	Lachine	QC	H8T 2Y8			
spices	Tanner Seeds	David Tanner	RR #2 Box 8	Regina	SK	S4P 2Z2	(306) 757-7012	(306) 347-2356	
spices	Sudom Seeds	Blaine Sudom	Box 161	Avonlea	SK	S0H 0C0	(306) 868-4620	(306) 868-4620	b.sudom@sk.sympatico.ca
spices	Hjertaas Seed	Blaine Hjertaas	Box 760	Redvers	SK	S0C 2H0	(306) 452-3882	(306) 452-3884	Bhjer@sk.sympatico.ca

18.4 Processors/Distributors

Market Segment	Company	Contact	Address	City	State/Province	Postalcode	Phone #	Fax #	Website/ E-mail
culinary and medicinal herbs	Stryka Botanics Co. Inc.		239 Homestead Rd.	Hillsborough	NJ	08844	(908) 281-5577	(908) 281-5392	www.stykа.com
culinary and medicinal herbs	Vitality Works	mitch@vitalityworks.com	5821-D Midway Park Blvd. NE	Albuquerque	NM	87109	(505) 268-9950	(505) 268-9952	www.vitalityworks.com
culinary herbs	Natrol	Lisa Krieger	21411 Prairie St.	Chatsworth	CA	91311	(800) 326-1520		www.natrol.com
culinary herbs	New Chapter	Colleen Hartigan	22 high street PO Box 1947	Brattleboro	VT	05302	(800) 543-7279	(800) 470-0247	www.new-chapter.com
culinary herbs	Eclectic Institute	Jason Hunolt	36560 SE Industrial Way	Sandy	Oregon	97055	(877) 867-4372		email: emp@eclecticherb.com
culinary herbs	CadCan Marketing & Sales Inc.	Michael Cadrin	3412 - 9th St. S.E.	Calgary	AB	T2G 3C3	(403) 287-6731	(403) 287-6732	cadring @cadvision.com
culinary herbs	Happy Planet Foods Inc.	Steve Everitt	1138 East Georgia St.	Vancouver	BC	V6A 2A8	(604) 253-7550	(604) 258-9462	www.happyplanet.com
essential oils	Quest International		P.O. Box 2, 1400 CA	Bussum	The Netherlands				www.queststintl.com

Market Segment	Company	Contact	Address	City	State/Province	Postalcode	Phone #	Fax #	Website/ E-mail
essential oils	Takasgo		5-17-1 Futako Takatsu-ku	Kawasaki 213	Japan		(044) 822-4111	(044) 822-4111	www.takasago-i.co.jp
essential oils	Ecom Trading Corporation			Toronto	ON		(416) 298-6051		www.ecomcanada.com
essential oils	Givaudan	Jeffrey Milton	RR2, Box 2093, Airport Road	East Stroudsburg	PA	18301-9629	(570) 476-6300	(570) 476-1110	http://ingredients.givuadan.com
essential oils	Amrita Aromatherapy	Christoph Streicher	1900 West Stone	Fairfield	IA	52556	(641) 472-9136	(641) 472-8672	www.amrita.net
essential oils	Essential Nature Aromatherapy	Jeffrey Reynolds	P.O. Box 65020	Calgary	AB	T2N 4T6	(403) 245-9280	(403) 245-9255	www.essential-nature.com
essential oils	Firmenich	Yvette McKnight	P.O. Box 5880	Princeton	NJ	08543	(609) 452-1000		www.firmenich.com
essential oils	SPI Pharma	bbanko@spipolyols.com	321 Cherry Ln.	New Castle	DE	19720	(302) 576-8500	(302) 576-8569	www.spipharma.com
essential oils, culinary herbs	Lebermuth Company	Allan Bond	PO Box 4103	South Bend	IN	46634	(800) 648-1123	(800) 852-4722	www.lenermuth.com
medicinal herbs	Alsi Ce Ltee	(would not provide)	PO Box 5040 150 rue Seigneuriale	Beaupor t	QC	G1E 6B3	(418) 661-6703	(418) 661-8984	

Market Segment	Company	Contact	Address	City	State/Province	Postalcode	Phone #	Fax #	Website/ E-mail
medicinal herbs	Camocare	Veneer Goodwin	207 East 94th St.	New York	NY	10128	(800) 226-6227		www.CamoCare.com
medicinal herbs	Canomega Industries Inc.	James Strate	412 - 1220 Sheppard Ave. E.	North York	ON	M2K 2S5	(819) 827-5400	(819) 827-5400	www.omegavite.com
medicinal herbs	Rhino Naturals	Hans Kamdar	1541 1/2 Westwood Blvd	Los Angeles	CA	90024	(310) 478-1413		hans@rhinonaturals.com
medicinal herbs	Ashbury Biologicals Inc.	Mike O'Connell	4700 Keele St., Rm. 108	North York	ON	M3J 1P3	(416) 736-5585	(416) 736-5846	www.dalton.com
medicinal herbs	Bona Dea Ltd.	Bernd Rohlf	105 Lexington Road Unit 7	Waterloo	ON	N2J 4R7	(519) 886-4200	(519) 886-6735	www.bona-dea.com
medicinal herbs	Advitech Solutions Inc.	R. Beauchesne	650, Boul. Pere Lelievre, bureau 170	Vanier	QC	G1M 3T2	(418) 686-7498	(418) 686-2446	www.advitech.com
medicinal herbs	Boehringer Ingelheim (Canada)	Jamie Malpass	5180 South Service Rd.	Burlington	ON	L7L 5H4	(905) 631-4550	(905) 639-5293	www.questvitamins.com
medicinal herbs	Essiac Products Inc.	Joan Dobbie	1218 Cromwell Rd.	Halifax	NS	B3H 4L2	(902) 429-4449	(902) 429-4858	www.ardefen.com
medicinal herbs	Essential Solutions	Dave Randle	33 Maryjane Rd.	Wyevale	ON		(705) 322-0550	(705) 322-0249	email: cawolda@yahoo.com
medicinal herbs	Altex Processing Inc	Tom Gordon	4040 Casorso Rd	Kelona	BC	V1W 4N6	(250)769-5422	(250) 769-5674	www.altexprocessing.com

Market Segment	Company	Contact	Address	City	State/Province	Postalcode	Phone #	Fax #	Website/ E-mail
medicinal herbs	Health-Wise Nutrition Inc.	John Osborn	634 Colby Dr., Unit 16	Waterloo	ON	N2V 1A2	(519) 747-5965	(519) 747-4928	
medicinal herbs	Herbs for Horses Ltd.	Sara Davies	61 Lewis Rd.	Guelph	ON	N1H 1E9	(519) 824-8518	(519) 824-4855	www.horseherbs.com
medicinal herbs	Herbon Naturals, Inc.	Aaron Smith	120 - 11300 River Rd.	Richmond	BC	V6X 1Z5	(604) 214-0705	(604) 214-0715	www.herbon.com
medicinal herbs	Flora Manufacturing and Distributing	Suzanne Diamond	7400 Fraser Park Dr.	Burnaby	BC	V5J 5B9	(604) 436-6000	(604) 436-6060	www.florahealth.com
medicinal herbs	Comvita		91 Rylander Blvd, Suite 7-156	Toronto	ON	M1B 5M5	(416) 284 6514	(416) 284 2725	www.comvita.com
medicinal herbs	Herbasante Inc.	Martine Bellemare	6691 Thimens Blvd.	St.-Laurent	QC	H4S 1W2	(514) 333-7400	(514) 333-6160	www.herbasante.ca
medicinal herbs	Herbages Normex Ltd.	Robert Normandan	1060 Place Verner	Laval	QC	H7E 4P2	(450) 661-8037	(450) 661-4396	
medicinal herbs	Boiron Canada Inc.	Majid Ojoudi	816 rue Guimond	Longueuil	QC	J4G 1T5	(450) 442-2066	(450) 442-3077	www.boiron.ca
medicinal herbs	Herb Pharm	Thorin Halvorson	PO Box 116	Williams	Oregon	97544	(503) 846-6262		www.herb-pharm.com

Market Segment	Company	Contact	Address	City	State/Province	Postalcode	Phone #	Fax #	Website/ E-mail
medicinal herbs	Capsuline Canada Inc.	Rob Rose	B15, 6020 - 2nd St. S.E.	Calgary	AB	T2H 2L8	(403) 252-0177	(403) 252-0176	www.colostrumcanada.com
medicinal herbs	Innovative Natural Products	Sandy Day, Jackie Briggs	2140 Enterprise St.	Escondido	CA	92029	(760) 738-7890	(760) 796-5139	www.inovnatprod.com
medicinal herbs	Chai-Na-Ta Corp.	Virginia Nguyen	5965 205A St.	Langely	BC	V3A 8C4	(604) 533-8883	(604) 533-8891	www.chainata.com
medicinal herbs	Fairwind Gardens Ltd.	Ron Lefebvre	P.O. Box 126, Trans Canada Hwy.	Pritchard	BC	V0E 2P0	(250) 577-3466	(250) 577-3466	rlefebvre@wkpowerink.com
medicinal herbs	El Peto Products Ltd.	Rob Dawson	41 Shoemaker St.	Kitchener	ON	N2E 3G9	(519) 748-5211	(519) 748-5279	www.elpeto.com
medicinal herbs	Donmar Health & Beauty Prod.	Anthony A. Menna	150 Industrial Parkway N.	Aurora	ON	L4G 4C3	(905) 726-3463	(905) 726-3467	www.donmar.ca
medicinal herbs	Diversified Nutrition Lifestyle	Ken Binda	109 - 2710 Lancaster Rd.	Ottawa	ON	K1B 4W8	(613) 260-8795	(613) 260-8796	www.nutrition.ca
medicinal herbs	Deliteful Foods Inc.	Bill Burrell	129 Bow Meadows Cr.	Canmore	AB	T1W 2W8	(403) 678-6776	(403) 678-3664	www.healthyself.com
medicinal herbs	Alta Natural Herbs and Supplements Ltd.	Greg Shafransky	1148-20800 Westminister Hwy.	Richmond	BC	V6V 2W3	(604) 303-1130	(604) 303-1132	www.alta-natural.com

Market Segment	Company	Contact	Address	City	State/Province	Postalcode	Phone #	Fax #	Website/ E-mail
medicinal herbs	Holista Health Corp.	Petreece Salterio	70 Glacier St.	Coquitlam	BC	V3K 5Y9	(604) 469-4372	(604) 469-4382	www.holistahealth.com
medicinal herbs	Hauser Inc.	Greg Hukaby	5555 Airport Blvd.	Boulder	CO	80301	(800) 241-2322		www.hauser.com
medicinal herbs	Freshwood Farm	Nick Hutchinson	C.8 RR4	Armstrong	BC	V0E 1B0	(250) 546-2449	(250) 546-2449	
medicinal herbs	NuSkin (Utah branch)		75 West Center	Provo	UT	84601	(801) 345-1000		www.nuskin.com
medicinal herbs	Eclectic Echinacea	Rob Chabot	662 Lombard Dr.	Victoria	BC	V9C 3Y9	(250) 478-2924	(250) 391-1622	eclectic@islandnet.com
medicinal herbs	Delano Health Products	Claude Hebert	300 rue du Saint Sacrement, Ste. G25	Montreal	QC	H2Y 1X4	(514) 845-1691	(514) 842-9455	www.delano.net
medicinal herbs	InnerSense International	Steve Carillo					(780) 467-0471		innersense@home.com
medicinal herbs	Arjo Canada Inc.	Chris Sloan	6535 MillCreek Dr., Unit 53	Mississauga	ON	L5N 2M2	(905) 813-8088	(905) 813-8072	
medicinal herbs	Inter-Cal/Ester-C®	info@intercal.com	6735 Inter-Cal Way	Prescott	AZ	86303	(520) 445-8063	(520) 778-7986	www.intercal.com
medicinal herbs	Interhealth Nutraceuticals	Kendra Penn	5451 Industrial Way	Benecia	CA	94510	(707) 751-2861	(707) 751-2801	www.interhealthusa.com
medicinal herbs	Lalilab Inc.	lalilab@worldnet.att.net	1415 Hamlin Rd.	Durham	NC	27704	(919) 620-6767	(919) 620-9575	www.lalilab.com
medicinal herbs	Motherland Herb Pharmaceutical Inc.	source@motherlandusa.com	13840 Magnolia Ave.	Chino	CA	91710	(909) 590-5471	(909) 590-5470	www.motherlandusa.com

Market Segment	Company	Contact	Address	City	State/Province	Postalcode	Phone #	Fax #	Website/ E-mail
medicinal herbs	MTC Nutritions Inc.	mtchem98@aol.com	141-07 20th Ave., Ste. 508	Whitestone	NY	11357	(718) 767-9081	(718) 767-9031	www.mtcindustries.com
medicinal herbs	NaturalCare Inc.	naturalcare@prodigy.net	730 E. Huntington Dr.	Monrovia	CA	91016	(626) 256-3338	(626) 256-3328	www.naturalcare-usa.com
medicinal herbs	Penwest	ddalessandro@penw.com	2981 Rt. 22	Patterson	NY	12563	(845) 878-3414	(845) 878-3420	www.penw.com
medicinal herbs	Technical Sourcing International, Inc.	lsmith@tsiinc.com	201 West Main St., Suite 101	Missoula	MT	59802-4326	(406) 549-9123	(406) 549-6139	www.tsiinc.com
medicinal herbs	Ferlow Brothers	Klaus Ferlow	P.O. Box 3197	Mission	BC	V2V 4J4	(604) 820-1777	(604) 820-1919	www.ferlowbrothers.bc.ca
medicinal herbs	HerbaMed Ltd.	herbamed@herbamed.co.il	Science Park Kiryat Weizmann	Rehovot	Israel	76326	972-8-9409648	972-8-9407640	www.herbamed.co.il
medicinal herbs	Euromed Canada Inc.	Alex Scheffler	17240 - 26A Ave.	Surrey	BC	V4P 9R2	(604) 535-4403	(604) 535-9851	euromedcanada@cs.com
medicinal herbs	Nature's Way Products	Dave Anderson	10 Mountain Springs Parkway	Springville	UT	84663-9999	(801) 489-1500	(801) 489-1563	www.naturesway.com
medicinal herbs	KicX Nutrition Inc	Doug Daymond	450 Speedvale Ave W #109	Guelph	ON	N1H 7Y6	(519) 836-8443	(519) 836-7784	
medicinal herbs	C&J Herbals Inc.	zhmm@msn.com	15421 Red Hill Ave., Ste. F	Tustin	CA	92780	(714) 259-7879	(714) 259-7877	www.herbalschina.com
spices	Kemin Foods LC	info@kemin.com	600 E. Court Ave., Ave. A	Des Moines	IA	50309	(515) 248-4000	(515) 248-4050	www.keminfoods.com

18.5 Processor/Distributor/Broker

Market Segment	Company	Contact	Address	City	State/Province	Postalcode	Phone #	Fax #	Website/ E-mail
medicinal herbs	Global Botanicals	Kathy Vessir	1167-A Ringwell Dr.	Newmarket	ON	L3Y 7V5	(705) 733-2117	(705) 733-2391	www.globalbotanical.com

18.6 Processor/Distributor/Retail

Market Segment	Company	Contact	Address	City	State/Province	Postalcode	Phone #	Fax #	Website/ E-mail
medicinal herbs	Pharmacia & Upjohn Corp.		100 Route 206 North	Peapack	NJ	07977	(908) 901-8000	(908) 901-8379	www.pnu.com
medicinal herbs	Alive Health Centre Ltd.		720 Park Royal North	Vancouver	BC	V7T 1X9	(604) 921-1928		
medicinal herbs	USANA Health Sciences	Phillip Cooper	3838 West Parkway Blvd.	Salt Lake City	UT	84120	(801) 954-7100		www.usana.com
medicinal herbs	Gaia Garden Herbal Dispensary	Chanchal Cambera	2672 West Broadway	Vancouver	BC	V6K 2G3	(250) 734-4372	(250) 734-4376	
medicinal herbs	Leiner Health Products	Jill Bianco ex. 1614	901 E. 233rd Street	Carson	CA	90745	(310) 835-8400	(310) 952-7760	www.leiner.com

18.7 Retailers

Market Segment	Company	Contact	Address	City	State/Province	Postalcode	Phone #	Fax #	Website/ E-mail
culinary herbs	Lifestream Natural Foods	Arran Stephens	7453 Progress Way	Delta	BC	V4G 1E7	(604) 420-9766		
culinary and medicinal herbs	Richters Herbs	Mr. Richter	357, Hwy. 47	Goodwood	ON	L0C 1A0	(905) 640-6677	(905) 640-6641	www.richters.com
medicinal herbs	Mountain Rose Herbs	Julie Bailey	P.O. Box 2000	Redway	CA	95560	(707) 923-7867		
medicinal herbs	Fred Meyers Co.		1540 South Redwood Road	Salt Lake City	UT	84104	(801) 977-2000		
medicinal herbs	Herbatint	Marie-Therese Dufour	40 East 34th St	New York	NY	10016	(877) 699-4400	(212) 683-5031	herbatintA@aol.co
medicinal herbs	HealthVentures	Louis Silberman	8260 East Gelding Dr.	Scottsdale	AZ	85260	(602) 427-0937		
essential oils	Aroma Naturals		1202 McGraw Ave	Irvine	CA	92614	(800) 462-7662	(800) 955-9481	www.aromanaturals.com
medicinal herbs	Thompson's Homeopathic	Suzanne Katz	844 Yonge St.	Toronto	ON	M4W 2H1	(416) 922-2300	(416) 922-2874	
medicinal herbs	Pharmavite	Cherie D'Urso ex. 5586	75451 San Fernando Mission Blvd.	Mission Hills	CA	91345	(818) 221-6200		www.pharmavite.com
medicinal herbs	Country Life	(would not provide)	101 Corporate Drive	Hauppauge	NY	11788	(631) 231-1031	(631) 232-5051	www.country-life.com
medicinal herbs	Angelica Herb And Spice	Chantal Arnaud	137 1st Ave.	New York	NY	10003	(212) 677-1549		

Market Segment	Company	Contact	Address	City	State/Province	Postalcode	Phone #	Fax #	Website/ E-mail
medicinal herbs	Terra Firma Botanicals Inc.	River Kennedy	542-West 19th Ave.	Eugene	OR	97401-3850	(541) 485-7726		
medicinal herbs	Cloud Star		PO Box 14437	San Luis Obispo	CA	93406	(800) 361-9079	(805) 544-1593	
medicinal herbs	Viobin USA		226 W Livingston St	Monticello	IL	61856-1673	(217) 762-2561		www.viobinusa.com
medicinal herbs	Super Nutrition	Kathy Mooney/Patrick	1925 Brush St.	Oakland	CA	94612	(800) 262-2116	(510) 821-4442	supernutritionvites@hotmail.com
medicinal herbs	Elixir Farm Botanicals LLC	Vinnie McKinney	General Delivery	Brixey	Missouri	65618	(417) 261-2393	(417) 261-2355	www.elixirfarm.com
medicinal herbs	Schiff Products Inc. (retail branch of Weider		2002 S 5070 W	Salt Lake City	UT	84104-4726	(801) 975-5300		www.schiffvitamins.com
medicinal herbs	Synergy Plus Inc. (a branch of IVC Industries)	Arthur Edell	500 Halls Mill Rd	Freehold	NJ	07728-8811	(732) 308-3000		www.ivcinc.com
medicinal herbs	Wyeth-Ayerst Pharmaceuticals	Deseret Haywood, ex. 4587	201 King of Prussia Road	Radnor	PA	19087	(610) 902-1200		www.wyeth.com

18.8 Wholesalers

Market Segment	Company	Contact	Address	City	State/Province	Postalcode	Phone #	Fax #	Website/ E-mail
culinary herbs	Basic Listings	Redgie Hansen	7645 E Evans Rd	Scottsdale	AZ	85260	(480) 483-2791		
culinary herbs	Spring Wind Herb Co.	Andrew Ellis	6-2325 4th St	Berkeley	CA	95471 0-2406	(510) 849-1820	(510) 849-4886	
culinary herbs	Beck Western Brokerage	Mike Choumcos	2320 South 1270 West, Suite B	Salt Lake City	UT	84119	(801) 973-6333		
essential oils	FPI Sales (North American) Inc.	Richard Gaetz	100 - 13551 Verdun Place	Richmond	BC	V6V 1W5	(604) 207-9199	(604) 303-0717	www.fpi-america.com
medicinal herbs	A&A Pharmachem inc.	Nav Aggarwal	4-77 Auriga Dr	Nepean	ON	K2C 7Z7	(613) 228-2600	(613) 224-0444	www.aapharmachem.com
medicinal herbs	Canada Colors & Chemicals Ltd.	Mel McDorough	152 Kennedy Rd. S.	Brampton	ON	L6W 3G4	(905) 459-1232	(905) 459-6610	www.canadacolors.com
medicinal herbs	Alchem International		201 Empire Plaza	New Delhi	India		91-11-6808420		
medicinal herbs	Martin Bauer Group (Finzelberg)	rspreemann@plantextrakt-inc.com	2 Sylvan Way	Parsippany	NY	07960	(973) 683-1411	(973) 683-0177	www.martin-bauer.com
medicinal herbs	Triarco Industries Inc.	Brooke Lane	17815 Newhope St., Suite B	Fountain Valley	CA	02798	(714) 241-7300	(714) 241-7387	www.triarco.com

Market Segment	Company	Contact	Address	City	State/Province	Postalcode	Phone #	Fax #	Website/ E-mail
medicinal herbs	Swiss Herbal Remedies Ltd.	Ken Davrey	35 Leek Cres.	Richmond Hill	ON	L4B 4C2	(905) 886-9500	(905) 886-5434	www.swissherbal.ca
medicinal herbs	Frank E. Dempsey & Sons Ltd.	Shaun D. Clements	47 Davies Ave.	Toronto	ON	M4M 2A9	(416) 461-0844	(416) 461-7048	www.fedson.com
medicinal herbs	Botanical Laboratories	Jeff kuklenski/Scott Sticklin/Dennis Olson	1441 West Smith Road	Ferndale	WA	98248	(360) 384-5656	(360) 384-1140	www.botanicallaboratories.com
medicinal herbs	Blessed Herbs Inc.	Micheal Volchok	109 Barre Plains Rd.	Oakham	MA	01068-9675	(508) 882-3839	(508) 882-3755	
medicinal herbs	Daminco	Andrew Evans	2770 Portland Drive	Oakville	ON	L6H 6R4	(905) 829-2414	(905) 624-6319	
medicinal herbs	Sanjiu Pharmaceuticals and Neutraceuticals	Katherine	111 West Ocean Blvd Suite 1120	Long Beach	CA	90802	(562) 491-4400	(562) 491-4401	www.SanjiuUSA.com /Info@SanjuiUSA.com
medicinal herbs	Nature's Cathedral	Leroy Ballard	1995 78th St	Blairstown	IA	52209	(319) 454-6959	(319) 454-9049	
medicinal herbs	Gurvey & Berry Co. Inc.	Niki Kolokotronis	310 Judson St., Unit 15	Toronto	ON	M8Z 5T6	(416) 259-5700	(416) 259-5417	www.gurveyberry.com
medicinal herbs	Pharmline Inc.	John Witterschein	41 Bridge St	Florida	NY	10921-1323	(845) 651-4443	(845) 651-6900	(currently no website)
medicinal herbs	Gourmet Nutrition FB Inc.	Daniel H. Genier	21214 Leonard-de-Vinci	Ste-Julie	QC	J3E 1Z2	(450) 922-2885	(450) 922-2886	www.gourmetfb.com
Market Segment	Company	Contact	Address	City	State/Pr	Postalco	Phone #	Fax #	Website/ E-mail

					ovi nce	de			
spices	G.H. Schmweitzer Ent. Ltd.	Gary Schweitzer	Box 222	Eston	SK	S0L 1A0	(306) 962-4751	(306) 962-3251	
spices	Dandilee Spice Corp.	Brian Petracek	Box 74	Gerald	SK	S0A 1B0	(306) 745-2510	(306) 745-2510	
spices	Saskatchewan Wheat Pool	Robert McNab	2625 Victoria Ave.	Regina	SK	S4T 7T9	(306) 569-5195	(306) 569-4424	www.swp.com
spices	Moran Farms	Shaun Moran	RR #4, Box 16	Portage la Prairie	MB	R1N 3A4	(204) 274-2114	(204) 274-2653	mfi@portage.net

18.9 Wholesaler/Processor

Market Segment	Company	Contact	Address	City	State/Province	Postalcode	Phone #	Fax #	Website/ E-mail
essential oils	A.M. Todd Botanicals	A. John Todd III	1717 Douglas Ave	Kalamazoo	MI	49007-1600	(616) 343-2603		www.amtbotanicals.com
medicinal herbs	Pacific Botanicals	Mike Moran, Mark Wheeler	4350 Fish Hatchery Rd	Grants Pass	OR	97527-9547	(541) 479-7777	(541) 479-5271	www.pacificbotanicals.com
medicinal herbs	Pure World Inc.	Natalie I. Koether	376 Main St.	Bedminster	NJ	07921	(908) 234-9220	(908) 234-9355	
medicinal herbs	St. Francis Herb Farm Inc.	Monic & Jeremy Rivett-Carnac	104 Maika Rd.	Comberm ere	ON	K0H 1L0	(613) 756-6279	(613) 756-0002	stfrancisherbfarm@webhart.net
spices	Bush Dreams Spices	David Evans	PO Box 336	Pickering	ON	L1V 2R6	(905) 686-1375	(416) 960-4803	bushdreams.hale.evans@sympatico.ca

19 Canada's Infrastructure: Organizations, Associations and Government Departments

19.1 British Columbia

Bio-Dynamic Agriculture Society of BC
Bio-dynamic agriculture involves use of special preparations to assist proper composting of waste materials which are then returned to the soil, plus planting/harvesting seasons determined according to astrological phases.
49350 Prairie Central Road
R.R. #1
Chilliwack, BC
V2P 6H3
Phone/Fax: (604) 794-3999
Email: forstnff@dowco.com

British Columbia Agriculture Council
#102 - 1482 Springfield Road
Kelowna, BC
V1Y 5V3
Phone: (250) 763-9790
Fax: (250) 762-2997

British Columbia Association for Regenerative Agriculture
Intent is promotion of a healthful, accountable, permanent, regenerative approach to agriculture; the certification body for the Fraser Valley.
Box 1601
Aldergrove, BC
V4W 2V1
Phone: (604) 322-1215
Fax: (604) 301-1017
Email: nhughes@portal.ca

British Columbia Biotechnology Alliance
The Alliance works to improve the climate in which the business of biotechnology is conducted in BC.
Suite 450 – 122 Mainland Street
Vancouver, B.C.
V6B 5L1
Phone: (604) 689-5602
Fax: (604) 689-4198
www.biotech.bc.ca

British Columbia Branch of the Canadian Seed Growers Association
The CSGA is the national pedigreeing agency for seed produced in Canada. The BC Branch represents the interests of seed growers in this province and promotes the use of certified seed by commercial farmers.
10003 - 110 Avenue, Ste. 350
Fort St. John, BC
V1J 6M7
Phone/Fax: (250) 787-3240

British Columbia Functional Food and Nutraceutical Network Inc.
This is an association which represents the functional foods and nutraceutical industry in B.C. The purpose of the organization is to facilitate the exchange of scientific and technological information among its members.
www.bcfn2.com

B.C. Grain Producers Association
Commodity organization involved in research and industry development activities related to grains, oilseeds and pulse crops in the BC Peace region.
PO Box 6004
Fort St. John, BC
V1J 4H6
Phone: (250) 784-2234
Fax: (250) 784-2299

British Columbia Herb Growers
The purpose of the BC Herb Growers Association is to promote, facilitate and enhance herb growing.
www.bcherbgrowers.com

British Columbia Horticultural Coalition
The Coalition is responsible for research, lobbying and monitoring of legislation associated with the horticultural industries.
#205 - 10330 - 152nd Street
Surrey, BC
V3R 4G8
Phone: (604) 588-1958
Fax: (604) 588-1010

British Columbia Institute of Agrologists
AIC is a federation of nine Provincial Institutes of Agrologists and nine Scientific Societies. AIC provides a forum for scientific input into policy decisions relating to agriculture and the agri-food industry, and developing an international presence for Canadian Agrologists.
www.bcia.com

British Columbia Ministry of Agriculture & Food
The ministry works with the agriculture, food and fisheries sectors to help build strong rural communities.
www.agf.gov.bc.ca

Certified Organic Association of British Columbia
As the over-body for the regional associations, the COABC attempts to avoid duplication of certification and coordinates efforts of the various groups.
www.CertifiedOrganic.bc.ca

Farm Business Management Information Network - British Columbia
This information technology project sources and develops practical farm business management information and presents this information through factsheets, publications and the FBMInet-BC web site for use by British Columbia producers and other agricultural professionals.
http://fbminet.ca/bc

Fraser Valley Farm Direct Marketing Association
This Farm Fresh Guide is produced for you by the Fraser Valley Farm Direct Marketing Association to help you find the products you most enjoy buying fresh from local farms.
www.bcfarmfresh.com/default.asp

Industrial Hemp Growers Association of BC
c/o Lee Wells
R.R. #1, S 200
Grand Forks, BC
V0H 1H0
Phone: (250)442-0333

19.2 Ontario

Canada-Ontario Agriculture Green Plan
Its purpose is to contribute to Canada's sustainable development strategy.
http://res2.agr.ca/london/gp/gphompag.html

Landscape Ontario – Horticulture Trades Association
The mission of Landscape Ontario is to advance the interests of the Horticultural Industry.
www.hort-trades.com

Ontario Garlic Growers' Association
The Garlic Growers of Ontario was formed with the objectives of helping growers of garlic, assisting the growth of the industry in Ontario, and promoting the use of garlic.
www.garlicgrowers.on.ca

Ontario Ginseng Co-operative Inc.
The Ontario Ginseng Co-operative was established in 1998 to organize the many ginseng growers located in southwestern Ontario, Canada.
www.ontarioginsengco-op.com/index.html

Ontario Horticulture Association
The OHA is an association of 270+ societies with more than 40,000 members throughout the province of Ontario. They seek to promote civic beautification, preservation of the environment, youth work and education in many aspects of horticulture.
www.interlog.com/~onthort/

Ontario Ministry of Agriculture, Food and Rural Affairs
www.gov.on.ca/OMAFRA

Ontario Soil and Crop Improvement Association
It is a unique non-profit farm organization that promotes the communication and facilitation of responsible economic management of soil, water, crops and air.
www.ontariosoilcrop.org

19.3 Saskatchewan

Saskatchewan Agriculture and Food
www.gov.sk.ca/govt/agfood

Saskatchewan Economic and Cooperative Development
www.gov.sk.ca/govt/econdev

Saskatchewan Food Industry Development Center
The Saskatchewan Food Industry Development Centre's mission is to assist in the development and continued growth of a dynamic food processing sector by providing an extensive understanding of markets and support mechanisms for technology and human resource development.
www.foodcentre.sk.ca

Saskatchewan Food Processor's Association
The Saskatchewan Food Processors Association was formed in 1990 as a nonprofit organization designed to strengthen the food processing industry in Saskatchewan.
www.sfpa.sk.ca

Saskatchewan Herb and Spice Association
www.saskherbspice.org

Saskatchewan Opportunities Corporation
The Saskatchewan Opportunities Corporation (SOCO) targets investment in six sectors that are of proven economic strength in Saskatchewan and offer opportunities for expansion. Its investment focus is on opportunities that provide in-province value-added

manufacturing and processing, with emphasis on export-oriented and import-replacement projects.
www.soco.sk.ca

Saskatchewan Research Council
SRC's mission is to help the people of Saskatchewan strengthen the economy with quality jobs and a secure environment. They do it through research, development, and the transfer of innovative scientific and technological solutions, applications and services.
www.src.sk.ca

Saskatchewan Trade & Export Partnership
To work in partnership with Saskatchewan exporters and emerging exporters to maximize commercial success in global ventures. STEP will deliver superior marketing services using its team of trade specialists, innovative approaches and world wide networks.
www.sasktrade.sk.ca

Saskatoon Regional Economic Development Authority
SREDA Inc. sponsors regular events to promote Saskatoon Region economic development, and to assist local companies with the development of skills to enhance competitiveness.
www.sreda.com

19.4 Canada

Agriculture and Agri-Food Canada - Matching Investment Initiative
http://res2.agr.ca/research-recherche/industry/mii/match.html

BIOTECanada
BIOTECanada is the association representing companies and research organizations involved in all aspects of biotechnology in Canada.
www.biotech.ca

Canada Business Service Centres
It is the premier gateway to government information for business, through a network of information centres across Canada.
www.cbsc.org

Canada Seabuckthorn Enterprises Limited
It is committed to preserving the integrity of this vital resource. The whole is greater than the sum of its parts, and it is this powerful synergy which we seek to bring to the marketplace — to deliver from farm, to processing, to consumer; products that reflect this harbinger of life.
www.seabuckthorn.com

Canadian Association of Specialty Foods
CASF currently serves more than 200 member companies who are engaged in all aspects of the industry. Representing large and small operations, members include retailers, wholesalers, manufacturers, importers, trade organizations, government agencies, as well as suppliers of accessories, service and equipment.
www.cfta.ca/casf/casf.html

Canadian Farm Business Management Council
Canada's only national organization devoted exclusively to farm management.
http://www.cfbmc.com

Canadian Food Trade Alliance
It is a coalition of key national and provincial food industry associations whose common goal is to encourage the growth of the Canadian food processing industry at home and abroad.
www.cfta.ca

Canadian Health Food Association
CHFA members believe that the unrestricted availability of natural health foods and nutritional supplements is the democratic right of every Canadian. To that end, they are committed to protecting and furthering the interests of the Canadian health products industry.
www.chfa.ca

Canadian Hemp Growers Association
c/o Michael Hansen
14722 - 64th Avenue #12
Surrey, BC
V3S 1X7
Phone: (604) 507-HEMP
Fax: (604) 574-5258

Canadian Herb Society
The Canadian Herb Society (CHS) is a national non-profit association which was founded to provide accurate information, education, networking, and representation for all those with an interest in herbs. It offers an organizational umbrella for special interests of herb enthusiasts and a forum for the exchange of knowledge and ideas.
www.herbsociety.ca

Canadian International Grains Institute
The Canadian International Grains Institute (CIGI) is a non-profit facility dedicated to providing educational programs and technical activities in support of market development and promotion of world markets for Canada's grains, oilseeds and special crops.
www.cigi.ca

Canadian Spice Association
885 Don Mills Road, Suite 301
Don Mills, ON
M3C 1V9
(416) 510-8036 (ext.2232)

Canadian Technology Network
If you run a small or medium-sized technology related business in Canada, the Canadian Technology Network can give you access to a wide range of technology and related business assistance through a cross-country network of advisors.
http://ctn.nrc.ca

Dietitians of Canada
Dietitians of Canada is an association of food and nutrition professionals committed to the health and well-being of Canadians. Dietitians of Canada supports its members to take action to improve health through food and nutrition strategies - shaping policy, providing services, and encouraging research.
www.dietitians.ca

Export Development Corporation
EDC is a Canadian financial institution devoted exclusively to providing trade finance services to support Canadian exporters and investors in some 200 markets, 130 of which are in developing markets.
www.edc.ca

Food and Consumer Products Manufacturers of Canada
With its focus on member services, along with customer and public policy initiatives, the FCPMC has established itself as a dominant food and consumer products association in Canada. Its mission is to enhance growth and competitiveness of the food and consumer products manufacturing industry.
www.fcpmc.com

Food Beverage Canada
FBC was formed in June 1994 with a mandate to unite the international marketing efforts of the processing industry in western Canada and to assist companies in their efforts to become export aware, ready and active.
www.foodbeveragecanada.com

Food Institute of Canada
It is a business tool designed for food processors. It provides the best links to policy, regulatory, food safety, trade information and other sites.
http://foodnet.fic.ca

Health Canada
Health Canada is the federal department responsible for helping the people of Canada maintain and improve their health.
www.hc-sc.gc.ca

Industry Canada
The department works with Canadians throughout the economy and in all parts of the country to improve conditions for investment, improve Canada's innovation performance, increase Canada's share of global trade and build a fair, efficient and competitive marketplace.
http://info.ic.gc.ca

National Institute of Nutrition
It is an independent institute at the interface of nutrition science, consumers, government and industry. NIN was established in 1983 as a national non-profit organization to provide leadership in advancing the knowledge and practice of nutrition among Canadians.
www.nin.ca

National Research Council Canada, Plant Biotechnology Institute
Our mission is to perform, assist and promote strategic research in plant biotechnology, to improve and diversify Canadian industry, and to strengthen Canada's competitive position in the global economy by fostering an entrepreneurial culture.
www.pbi.nrc.ca

NSERC Industry Programs
It helps Canadian companies compete in today's economy by jointly funding collaborative R&D projects with scientists and engineers in universities across the country.
www.nserc.ca/indus_e.htm

Office of Natural Health Products
The Office will have the authority to approve natural health products for the Canadian market, thereby allowing Canadian consumers the freedom of choice in having safe natural health products available.
www.hc-sc.gc.ca/hpb/onhp/index.html

Revenue Canada Scientific Research & Experimental Development
This program is intended to encourage businesses – particularly small and start-up firms – to conduct SR&ED that will lead to new, improved, or technologically advanced products or processes.
http://www.ccra-adrc.gc.ca/sred/

STRATEGIS - Industry Canada
Canada's business and consumer site.
http://strategis.ic.gc.ca

Western Economic Diversification
Its mandate is to promote the development and diversification of the economy of Western Canada and to advance the interests of the West in national economic policy.
www.wd.gc.ca

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American Botanical Council: www.herbalgram.org
American Herbal Pharmacopoeia: www.herbal-ahp.org
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National Nutritional Foods Association: www.nnfa.org
Natural Product Industry Network: www.npicenter.com
Nutraceutical Alliance: www.nutraceuticalalliance.com
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Saskatchewan Agriculture and Food: www.agr.gov.sk.ca
Saskatchewan Nutraceutical Network: www.nutranet.org
USDA – Phytochemical and Ehtnobotanical Databases: www.ars-grin.gov/~ngrslb
Utah Nursery and Landscape Association: www.utahgreen.org

22 Speakers List

22.1 Marketing and Business

Lee Sturdivant, *San Juan Naturals*, Friday Harbour, WA.
Maureen Rogers, *The Herb Growing and Marketing Network*, Silver Spring, PA.
Richard Borbely, *AgroPharm*, Waterdown, ON.
Harold Moen, *Coulee Pickings Ltd.*, Regina, SK.
Robert Rogers, *AHG Herbalist*, Edmonton, AB.
Roy Sangster, *Sangster's Health Centre*, Saskatoon, SK.
Debbie Luce, *Herbs for All Seasons*, Metcalfe, ON.
Mary Buckles, *Prairie Home Herbs*, Mt. Puluski, IL.

22.2 Production

Jazeem Wahab, *Canada-Saskatchewan Irrigation Diversification Centre*, Outlook, SK.
Myles Bantle, *Bantle Engineering Research*, Saskatoon, SK.
Al Slinkard, *University of Saskatchewan*, Saskatoon, SK.
Manjula Bandara, *Crop Diversification Centre South*, Brooks, AB.
Margaret Crellin, Prince Albert, SK.
Erica Renaud, *Research Specialist, Frontier Organic Research Farm*, Norway, IA.
Thomas Li, *Agriculture & Agri-Food Canada*, Summerland, BC.
Richard Dufresne, *Targacept*, Greensboro, NC.
Mohyduddin Mirza, *Alberta Agriculture, Food and Rural Development*, Edmonton, AB.
Liz Russell, *Crop Diversification Centre South*, Brook, AB.

22.3 Processing

Buncha Ooraikul, *University of Alberta*, Edmonton, AB.
Branka Barl, *Herb Research Centre, University of Saskatchewan*, Saskatoon, SK.
Kelley Fitzpatrick, *Saskatchewan Nutraceutical Network*, Saskatoon, SK.
Daniel Gagnon, *Herbs Etc.*, Santa Fe, NM.

22.4 Other

Robin Marles, *Brandon University*, Brandon, MB.
John Crellin, *Memorial University*, St. Johns, NF.
Brenda Lynn Enns, *Continuing Medical Education, University of Saskatchewan*, Saskatoon, SK.
Keith Beaulieu, *Manitoba Agriculture & Food*, Carmen, MB.
Art Tucker, *Delaware State University*, Dover, DE.
Artur Klimasezewski, *Bioriginal Food and Science Corp.*, Saskatoon, SK.

Arlene Kestner, *Southern University*, Baton Rouge, LA.
Nancy Milligen, *Certifiied Aromatherapist*, Saskatoon, SK.
Ann McCormick, *Creative Seasoning*, Fort Worth, TX.
Brian Lawrence, *R.J. Renoylds Tobacco Company*, Winston-Salem, NC.
Stan Blade, *Alberta Agriculture, Food and Rural Development*, Edmonton, AB.
Kan-Fa Chang, *Alberta Agriculture, Food and Rural Development*, Brooks, AB.
Fran Eldridge, Saskatoon, SK.
Barbara Schulz, *Calendula Publishing*, Halifax, NS.
Chanchal Cabrera, *Cabrera Consultants Inc.*, Halifax, VA.
Ruth Shamai, *R & D Hemp*, Toronto, ON.
Kim Piquette, *Alberta Agriculture, Food and Rural Development*, St. Paul, AB.
Jean Giblette, *High Falls Gardens*, Philmont, NY.

23 Interview List

The following is a summary of list of the groups and individuals interviewed by the Consultants. Detailed information on each interviewee has been included in various places throughout the report. Therefore, in order to avoid duplication, supplementary information concerning each interviewee is not included in this section.

ADH Health Products Inc.
Agents
Alchem International
Allied Old English
Alta Natural Herbs And Supplements Ltd.
American Health
Amrita Aromatherapy
Angelica Herb And Spice
Aphrodisia
Arkopharma/Health From The Sun
Aroma Naturals
Asia Natural Products Inc.
Augustus Oils Auroma International inc
Avena Botanicals
Bee Health
Beehive Botanicals
Better Botanicals
Betts, Randy – owner of Puresource
BioForce Canada Inc.
Bio-Genesis Distributors
Biolandes
Bioriginal Food and Science Corp.
BioSuisse
Blackburn, Jim L. – Professor, College of Pharmacy and Nutrition, University of Saskatchewan
Blessed Herbs
Bodyonics
Boerick & Tafel
Botanical Laboratories
Botanicals International
Buchanan Trading Inc.
Burt's Bees
C.E. Jamieson & Co. Ltd.
Camocare
Canadian PhytoPharmaceuticals
Canadian Spice Association
Canamino
Celestial Seasonings
Chemco Industries Inc.

Chorney Chemicals
Christmas Natural Foods Inc.
Christopher Distributing
Cloud Star
Comvita
Coulombe, Roger (Professor of Toxicology at Utah State University)
Crowe, Trevor – College of Engineering, University of Saskatchewan
Crystal Star, Herbal Nutrition
David Cookson & Co. Inc.
Eclectic Institute
Essential Solutions
Essiac
Farnam Companies (Horse Health Products)
Flora Inc.
Flora Laboratories
Food Science of Vermont
Frontier Herbs
Gaia Herbs
GCI Nutrients
Geuro, Martin – owner of Maple Ridge Farms
Ginko Group
Ginseng Association of Ontario
Global Botanicals
Golden Bough Herb Co. Ltd
Growmax
Halford-Lewis Ltd.
Hauser Chemical Research
Health From The Sun
Helman Associates International Inc.
Herb Pharm
Herbalist and Alchemist
Herbalpathic
Herbatint
Herblife International Inc.
Holub, Bruce J. – Department of Human Biology and Nutritional Sciences, University of Guelph
Honso USA Inc.
Horizon Distributors
Horizon Herbs
Hudson, Jim – Canadian Centre for Medicinal Herbs
InnerSense International
Innovative Natural Products
International Flavours And Fragrances
J. Manheimer Inc.
Jackson, Chung-Ja C. – Laboratory Services, University of Guelph
Kalama Chemical
Kehler, Connie – Saskatchewan Herb and Spice Association

KGK Synergize Inc.
Laverna Products
Leeward Resources, Inc.
Leewing, Phillip – Director of Research, Weston, Food Development Group
Levlad Inc.
Lifestream Natural Foods
Linnea
Lotus Brands Inc.
Lynch, John A. – Manager of Marketing Unit, University of Guelph
MacaAdvantage
Master Formulae
McCormicks
McZand Herbal Inc.
Meer Corporation
Melichercik, John – Manager, Analytical Services, University of Guelph
Meridien Trading
Miller, Richard – industry consultant and author
Minaloa
Mountain Rose Herbs
Naka Sales Ltd.
Natrol
Natural Factors (Gahler Enterprises Ltd.)
Natures Gate/Levlad Inc.
Nature's Sunshine
Naturlite/KR natural Products
New Chapter
North American Hemp Company
Nutravim Nutraceutical Inc.
Ontario Herb and Spice Association
Organika Health Products Inc.
P.L. Thoman & Co., Inc.
Pearson, Wendy – Equine Research Centre, Medicinal Herb and Nutraceutical Research, University of Guelph
Penta Manufacturing
Pharma Nutrients
Point Vert
POS Pilot Plant Corp.
Pranarom
Puresource Inc.
Quest Vitamin Supplies Ltd.
Reckitt & Colman Canada Inc.
Rhema Industries Ltd.
Rhino Naturals
RIA International LLC
Richter, Conrad – owner of Richter's Seeds
Robinson Pharma Inc
Rogers, Maureen – Herb Marketing Network

Sabinza Corporation
San Francisco Herb and Natural Food Co.
San Francisco Herb Co.
Sanjiu Pharmaceuticals and Neutraceuticals
Saxena, Praveen K. – Professor, Department of Plant Agriculture, Biotechnology Division, Ontario Agriculture College
Se-cure
Sisu Enterprises Co. Inc.
Smith, Jonathan G. – Cluster Manager, University of Guelph
StarWest Botanicals
Stryka Botanicals Co. Inc.
Sunmore Health Tech Ltd.
Super Nutrition
Terra Firma Botanicals Inc.
The Essential Oil Company
The Good Scents Company
The Herb Shop
The Martin Bauer Group (Finzelberg)
The Nutrient Express
The Whole Herb Company
Tom's of Maine
Trade Technocrats
Trans Herb
Tree of Life, Inc. Ashley Koffman Foods
Triarco Industries Inc.
Trophic Canada Ltd.
Trout Lake Farm Company
Vita Health
Vita Tech
White Crane Productions Inc.
Wilcox Drug Co. (Wilcox Natural Products)
Wild Rose Laboratories
Yada, Rickey Y. – Professor, Department of Food Science, University of Guelph
Young Living Essentials Oils
Zia
Ztec Queen

Appendix A

Wholesale Herb Prices at the farm gate							
Source: Echinacea 2000 - Technical Crop Report - Herb Farming Series Book 2 - Published by Richters Herbs Herbworks, Private source							
		Canadian Dollars					
		1996	1997	1998	1999	2000	2001
E. angustifolia							
Root		27.00 - 37.50	27.00 - 37.50	22.50 - 33.00	15.00 - 22.50	12.00 - 15.00	
E. Purpurea							
Root		15.00 - 22.50	10.50 - 15.00	10.50 - 15.00	3.75 - 10.50	1.50 - 3.75	6.00 - 7.50
Herb		4.50 - 7.50	3.00 - 4.50	1.50 - 3.75	1.50 - 3.00	0.45 - 1.05	
Valerian		6.00 - 7.50	4.50 - 6.00	3.00 -4.50	0.98 -2.25	0.75 - 0.98	
Ginseng		30.00 - 60.00	30.00 - 52.50	22.50 - 37.50	12.00 - 30.00	8.00 - 25.50	$15

Burdock							$5.00
Hawthorn							4.00 - 5.00
Angelica Root (>500lbs)						2.25 - 7.20	
Borage Seed (>500 lbs)						1.00 - 9.75	
Calendula Flowers (>500 lbs)						2.7	
Caraway Seed (>500 lbs.)						.36 - 2.70	.45 - 1.00
Chamomile Flowers (>500 lbs.)						.75 - 6.75	
Comfrey Root (>500 lbs.)						3.00 - 5.92	

Coriander Seed (>500 lbs.)					.20 - 2.14	0.17
Dill Weed (>500 lbs)					2.46 - 6.75	0.5
Feverfew Leaf/Flowering Herb (>500 lbs)					.75 - 4.20	
Garlic Bulbs/Powder (>500 lbs.)					2.78	
Hemp Seed (>500 lbs)					.41 - .81	
Licorice Root (>500 lbs)					1.80 - 3.00	
Marshmallow Root (>500 lbs)					3.30 - 6.68	
Milk Thistle Seeds (>500 lbs)					1.95 - 3.60	

St. John's Wort (>500 lbs)						1.20 - 4.20	
Fenugreek							0.15
Quinoa							0.15
Spearmint							10.5